PHASE II SAMPLING AND ANALYSIS REPORT

FORMER P.R. MALLORY PLANT SITE
CRAWFORDSVILLE, INDIANA

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September 1988
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CONESTOGA-ROVERS & ASSOCIATES

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1.0 INTRODUCTION

1.1 GENERAL

The former P.R. Mallory plant site (Site) is located approximately three miles east of Crawfordsville, Indiana in Montgomery County as shown on Figure 1.1. Situated on lands currently owned by Terra Products Inc., the Site is bordered by State Road No. 32 to the south and Little Sugar Creek to the north. The concrete floor slab, pumphouse and incinerator, which are all that remain of the former operation, are located southwest of the ravine which drains the area to Little Sugar Creek.

P.R. Mallory manufactured dielectric capacitors at the Site from 1957 to 1969. During this period, a variety of dielectric fluids including oils containing polychlorinated biphenyls (PCBs) were used in the manufacturing process. Operations were temporarily suspended in 1968 after a fire destroyed the impregnation room in the northeast section of the plant. Operations were resumed until 1969 when a second fire destroyed the entire plant.

Duracell has consulted with the United States Environmental Protection Agency (USEPA) and the Indiana Department of Environmental Management (IDEM) and has undertaken the following work at the Site:

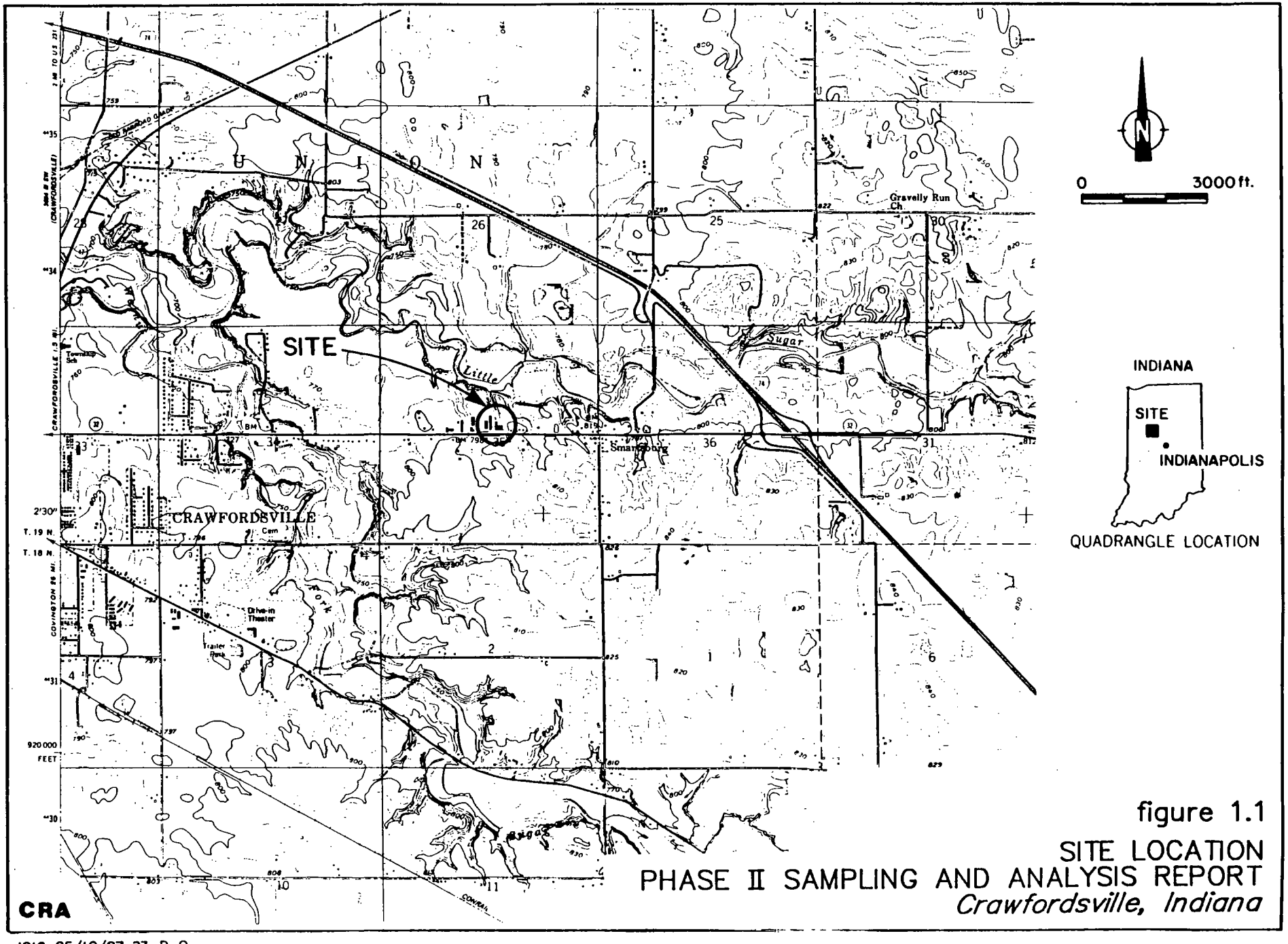

figure 1.1

SITE LOCATION

PHASE II SAMPLING AND ANALYSIS REPORT

Crawfordsville, Indiana

CRA

1916-25/10/87-23-D-0

i) Initial Site Screening Sampling Program (August 1986 to September 1986);

ii) Phase I Remedial Construction (December 1986 to January 1986);

iii) Phase I Sampling and Analysis Program (December 1986 to January 1987);

iv) Phase I Supplemental Sampling and Analysis Program (May 1987 to July 1987);

v) Phase II Remedial Construction (February 1988 to March 1988); and

vi) Phase II Investigative Program (February 1988 to May 1988).

Implementation of these programs has achieved the following objectives:

i) securement of the Site to prevent public access;

ii) on-Site securement of debris, capacitors and contaminated soils which potentially represented an imminent hazard to the environment;

iii) on-Site securement of materials from outside the Site fence containing elevated concentrations of PCB;

iv) delineation of the areal limits of residual contamination; and

v) delineation of the vertical limits of residual contamination over most of the site.

The programs implemented prior to Phase II are described in detail under separate cover in the reports referenced in Section 8. The Phase II remedial construction activities which were conducted concurrently with the Phase II investigative and sampling activities, are detailed in the report entitled, "Phase II Remedial Action Report - Former P.R. Mallory Plant Site - Crawfordsville, Indiana", dated September 1988, by Conestoga-Rovers and Associates (CRA). The Phase II Sampling and Analysis Program is presented herein.

1.2 SCOPE OF WORK

The scope of the completed Phase II sampling and analysis program was consistent with the scope of work presented in the "Phase II Response Action Work Plan - Former P.R. Mallory Plant Site - Crawfordsville, Indiana", dated November 1987, as subsequently amended December 15, 1987 to address comments from the USEPA and IDEM. In accordance with the approved work plan, the Phase II sampling and analysis activities consisted of confirmatory level and investigative level sampling and analysis.

Confirmatory level soil samples which were collected from the surfaces of areas excavated during the remedial construction program were analyzed to determine the concentrations of any residual PCBs. Additional confirmatory level samples were collected from the excavated and stockpiled soil and also from the dissembled pump parts to determine their appropriate disposition.

Investigative level samples were collected from:

i) soils underneath the plant slab at constructed sump locations;
ii) deep subsurface soils in areas of known contamination within the former plant yard;
iii) exploratory excavations;
iv) surficial soils in the ravine below the discharges from existing pipes;
v) the ravine creek bottom, bank and floodplain; and
vi) surficial soils within the former plant yard.

These samples were collected for additional characterization of the distribution of Site-specific compounds.

The installation of additional groundwater monitoring wells and the associated groundwater sampling and analysis program conducted as part of the Phase II effort are presented in detail in the report entitled, "Phase II Hydrogeological Investigation - Former P.R. Mallory Plant Site - Crawfordsville, Indiana", dated September 1988.

2.0 PHASE II SAMPLING AND ANALYSIS PROGRAM

2.1 GENERAL

Phase II sampling activities were conducted over two time periods. During the first sampling period, sampling activities commenced on February 9, 1988, and continued on a periodic basis concurrent with the Phase II remedial construction activities. The second sampling period occurred from April 25, 1988 to May 2, 1988 during the repair of the synthetic overliner detailed in the "Phase II Remedial Action Report". Sampling and analysis activities conducted during the second time period included those delayed due to difficult field conditions. Prior to commencing the second sampling period, preliminary results obtained from the first set of analyses were evaluated and the scope of the second sampling event was subsequently expanded based on the collected data.

A total of 158 samples were collected from the various Site media for the purposes of Site characterization, quality control/quality assurance, and for characterizing materials for disposal. Due to analytical holding time exceedances, only 136 of the total samples collected were analyzed. Surface wipe samples were collected from nine different locations on dissembled pump parts for characterization for disposal. The collection and analyses

of these samples are described in further detail in the following sections; the collection of the groundwater samples is detailed under separate cover.

2.2 SOIL SAMPLES

2.2.1 General

The soil sampling program was conducted to satisfy the data requirements for two different data objectives. Soil samples referred to as "confirmatory" were collected from excavated surfaces to determine the presence and quantitate the level of remaining residual PCBs, if any. Confirmatory soil samples were also collected from excavated and stockpiled soil to determine if the soil could be considered clean excavated soil. The analytical results from these samples shall be used to determine the need for additional excavation, if any, to meet the final remedial criteria to be established and the appropriate disposition of excavated materials, respectively. Soil samples referred to as "investigative" were collected from sample locations and depth intervals deemed appropriate to complete characterization of the distribution of substances on Site. The collection protocols for both levels of sampling were the same. However, the analytical and quality control/quality

assurance protocols implemented were different, being more stringent for the confirmatory samples due to the greater level of confidence required for the intended data usage. The analytical and quality control/quality assurance protocols implemented are described in Section 4.

Confirmatory soil samples were collected from the final base surfaces of excavated areas and from the soil placed in various soil stockpiles. Investigative soil and sediment samples for Site characterization purposes were collected from the following:

i) soils underneath the plant slab at constructed sump locations;
ii) deep subsurface soils in areas of known contamination within the former plant yard;
iii) exploratory excavations;
iv) surficial soils in the ravine below the discharges from various pipes;
v) the ravine creek bank and floodplain; and
vi) surficial soils within the former plant yard.

Investigative soil samples were analyzed for PCB; dioxin and furan analyses were conducted on samples from select locations. The sample locations and sample collection depths are shown on Plan 1.

2.2.2 Equipment Preparation

All soil sampling equipment was decontaminated prior to field use, in accordance with the procedures outlined in Section 3.1.

A new pair of disposable gloves was used for the collection of each sample from the various sample locations and different vertical depth zones. Each soil sample was placed in a laboratory-cleaned, pre-labeled sample jar and sealed with a teflon-lined cap.

2.2.3 Investigative Soil Samples

2.2.3.1 Plant Slab Sump Locations

Soil samples were collected from the soil underlying the plant slab at each of the three sumps constructed as part of the Phase II remedial program. Samples were collected from each of the top two 6-inch depth intervals.

The upper soil sample was collected by hand by coring a 2-inch diameter hole, 6 inches deep, with a pre-cleaned stainless steel spoon. Following collection of this uppermost sample, a larger hole, approximately 1 foot in

diameter and 6 inches deep, was excavated around the cored sample location with a hand shovel. This material was placed adjacent to the shovel hole. A clean knife or spoon then was used to scrape away the next 1/2-inch layer of soil in order to prevent cross-contamination of the lower 6-inch sample by soil which had fallen in. The lower 6-inch sample was collected by hand coring a second hole in the underlying soil with a new pre-cleaned spoon.

2.2.3.2 Deep Subsurface Soils

Subsurface soil samples were collected on February 23, 1988 from pits which were excavated at previous Phase I sample locations. The six sampling stations numbered 12, 15, 21, 30, 70 and 88 are in the vicinity of the former plant slab and incinerator, and are at locations where elevated PCB concentrations (typically greater than 500 ppm) were detected in the lowest sampled depth zone during previous sampling programs.

To expedite the excavation/soil sampling sequence, both a track-mounted hydraulic hoe and a wheel-mounted backhoe were used in tandem. While one machine was excavating, the other was taken to the decontamination pad for steam cleaning of the bucket, prior to either excavating the next sample layer or excavating at the next sample location.

At each deep subsurface sampling location, the machines were used to excavate a pit approximately 6 feet long by 4 feet wide. Overlying soil which was excavated to within approximately 1 inch of the top of the desired sampling zone was placed on the ground immediately adjacent to the hole. The remaining 1-inch layer of overlying soil was then scraped away with a pre-cleaned stainless steel knife or spoon prior to sampling, in order to prevent potential cross-contamination caused by smearing from the hoe bucket.

The soil sample was then collected by hand coring a 2-inch diameter hole, 6 inches deep, with a pre-cleaned stainless steel spoon. Following collection of this uppermost sample, a larger hole, approximately 1 foot in diameter and 6 inches deep, was excavated around the cored sample location with a hand shovel. This material was placed adjacent to the shovel hole. A clean knife or spoon was then used to scrape away the next 1/2-inch layer of soil in order to prevent cross-contamination of the next 6-inch sample by soil which had fallen in. The next 6-inch sample was collected by hand coring a second hole in the underlying soil with a new pre-cleaned spoon.

The hoe then was used to excavate the unsampled soil in the pit surrounding the two sampled 6-inch zones. Soil in the pit was removed to within approximately

1 inch of the third desired sample zone. Prior to excavation of this soil the hoe bucket was steam cleaned on the decontamination pad. The excavated soil was placed on a sheet of polyethylene adjacent to the pit. As for previous sample zones, a clean knife or spoon was used to scrape away the overlying 1-inch layer of soil in order to prevent potential cross-contamination of the sample zone caused by smearing from the hoe bucket. The next 6-inch sample was subsequently collected by hand coring a third hole in the exposed soil surface with a new pre-cleaned spoon.

Backfilling of each pit was performed in reverse sequence, to return excavated material to its originating depth.

During the repair of the synthetic overliner on April 25 and 29, samples pits located at sample locations 12, 15, 21 and 30 were re-excavated for additional sampling at greater depth. These locations were selected due to the elevated concentrations of PCB detected in the soil in the deepest zone sampled earlier in February. Samples were collected at 1-foot intervals following similar procedures to those described previously, from soil beneath the previous sample zones. Samples were collected at depths of up to 8 1/2 feet. In addition, samples were collected from pits excavated at sample locations 11, 86, 142 and 200 near the plant slab, and from sample location 129, for further Site characterization.

2.2.3.3 Exploratory Excavations

Test trenches were excavated on March 4 and 5, 1988 for the delineation of a number of underground pipes located on Site. Soil samples were collected from the exposed pipe bedding material found at two of the test trench locations. Samples were not collected at the other test trench locations, as either no pipe was found or ponded surface water filled the trench too quickly to allow sufficient time to collect a representative sample of the bedding material.

Upon locating a pipe, the backhoe was used to excavate soil away from the sides of the pipe to approximately one foot below the pipe invert. A pre-cleaned stainless steel knife or spoon then was used to scrape away the first 2 inches of the vertical surface of the exposed soil underlying the pipe, in order to prevent potential cross-contamination of the sample by material brought down by the hoe bucket. The bedding sample was collected by hand digging a small 2-inch deep hole in the vertical exposed surface, using a new pre-cleaned stainless steel spoon.

During the liner repair work on April 30, additional test trenches were excavated at locations around the Site, to complete the delineation of the underground pipes. Soil samples were collected from the bedding material

underlying each of the four pipes located, using similar methods to those presented above.

2.2.3.4 Ravine Locations and Pipe Discharge Zones

Soil samples were collected from a number of locations in the ravine to delineate the width of the affected zone in the ravine bottom. At former sample locations SD-15, SD-19 and SD-144, samples were collected from the bank, offset from the center of the ravine where the previous samples were collected. Other soil samples were collected from the ravine floodplain, at several locations downstream of the Site security fence and upstream of the ravine confluence with Little Sugar Creek.

In addition, samples were collected from surficial soils below the discharge of four pipes ending in the ravine. Sample locations were selected to be in the discharge path, approximately 1 foot from the end of the pipe.

Soil samples from the locations on the ravine bank and floodplain, and from the pipe discharge zones were collected by hand coring a 2-inch diameter hole, 6 inches deep, with a pre-cleaned stainless steel spoon.

2.2.3.5 Stream Sediment

Two sediment samples were collected from the ravine bottom at former sediment sample location SD-15. The samples were collected from depth zones "B" and "C", being the 6 to 12-inch depth zone and the 12 to 18-inch depth zone, respectively.

Prior to collection of the "B" sample, the upper 6 inches of stream sediment was excavated with a hand shovel, and placed downstream of the sample location.

A 2-inch diameter split-spoon, pre-cleaned in accordance with Section 3.1 was then driven manually into the stream bed to a depth of approximately 6 inches. The split-spoon was removed and opened on a clean plastic garbage bag. A clean cutting tool then was used to remove the upper one inch of sediment in order to prevent cross-contamination from the shovel. This material was discarded. Clean sampling tools were used to place the remaining 5-inch core in a clean pre-labeled sample jar.

The same split-spoon then was driven an additional 7 inches into the hole, for collection of the lower sample. The split-spoon was removed and opened on a clean plastic garbage bag. Clean cutting tools were used to

remove and discard the upper and lower one inch of material from the core. Another clean cutting tool was used to remove and discard the outer layer of material from the sample core. The remaining core material then was placed in a clean pre-labeled sample jar.

2.2.3.6 Surficial Soils within the Former Plant Yard

Soil samples were collected from surficial soils within the former plant yard to confirm previous analytical results and further delineate the distribution of chlorinated dibenzo-p-dioxins and chlorinated dibenzofurans. Samples were collected from various locations over the north portion of the yard at both previously sampled and new locations.

Soil samples were collected from the top 6-inch zone at each location and also from the underlying 6-inch zone at select locations. Soil samples were collected by hand coring a 2-inch diameter hole, 6 inches deep, with a pre-cleaned stainless steel spoon. When a deeper sample was collected, a larger hole, approximately 1 foot in diameter and 6 inches deep, was excavated around the cored sample location with a hand shovel and placed adjacent to the shovel hole. A clean knife or spoon was used to scrape away the top layer of soil in order to prevent cross-contamination of the

lower 6-inch sample. The lower 6-inch sample was collected by hand coring a second hole in the underlying soil with a new pre-cleaned spoon.

2.2.4 Confirmatory Soil Samples

2.2.4.1 Excavation Area "A"

Confirmatory soil samples were collected from five locations within the limits of Area "A", concurrent with the excavation of the ravine soil/sediment downstream. Over the upstream two-thirds of excavation Area "A", the base of the excavation appeared to be relatively dry. However, over the remaining downstream portion of the excavation near the Site security fence, the base of the excavation appeared to be saturated.

At three of the five sample locations, soil/sediment samples were collected from both the "A" (0-inch to 6-inch depth zone) and "B" (6-inch to 12-inch depth zone) sample zones, to a total depth of 12 inches. At the other two sample locations surface water ran into the hole which was excavated to collect the upper sample; therefore, the lower sample was not collected due to possible cross-contamination.

Soil samples were collected from the exposed in situ soil where excavation was complete. The upper soil sample was collected by hand coring a 2-inch diameter hole, 6 inches deep, with a pre-cleaned stainless steel spoon. Where the lower sample was to be collected, a larger hole, approximately 1 foot in diameter and 6 inches deep, was excavated around the sample core hole with a hand shovel. This material was placed in the excavated ravine, immediately downstream of the hole. A clean knife or spoon then was used to scrape away the next 1/2-inch layer of soil/sediment in order to prevent cross-contamination of the underlying 6-inch sample by the hand shovel. The next 6-inch sample was collected by hand coring a second hole in the underlying soil with a new pre-cleaned spoon.

2.2.4.2 Excavation Area "B"

Confirmatory soil samples were collected from four locations within the limits of excavation Area "B". Soil samples were collected from the exposed in situ soil, where excavation was complete, as excavation proceeded from sub-area to sub-area. The exposed soil was a moist sandy clay.

Soil samples were collected from the upper 6 inches by hand coring a 2-inch diameter hole, 6 inches deep, with a pre-cleaned stainless steel spoon.

2.2.4.3 Depth Zone 2 Stockpile Soil

Confirmatory soil samples were collected from the Depth Zone 2 soil excavated from Area "B" and placed in the Depth Zone 2 soil stockpile. The stockpiled soil had been mixed, to a large degree, by the equipment during placement of the soil in the stockpile.

Two soil samples were collected, one from the southwest corner and the other from the east side of the stockpile, each using a pre-cleaned 2-inch diameter split-spoon.

At each location, the split-spoon was forced horizontally into the face of the stockpile to a depth of approximately 2 feet. The split-spoon then was removed and opened upon a clean plastic garbage bag. The collected soil was emptied into a pre-cleaned stainless steel mixing bowl, and homogenized using pre-cleaned stainless steel utensils. A portion of the sample was then transferred to the sample jar.

2.3 SURFACE WIPE SAMPLES

2.3.1 General

Following steam cleaning, surface wipe samples were collected from the well assembly parts removed from the Site pumphouse well. A total of nine surface wipe samples were collected.

2.3.2 Wipe Sample Collection

Sampling areas were marked out and the borders taped to accurately determine the sample area. The size of the actual sample area was smaller than the 0.25 m^2 recommended in the work plan, due to the non-planar geometry of the parts to be sampled and the inability to properly access the entire length of pipe sections. The actual surface area sampled was measured and recorded prior to sample collection.

The wipe samples were collected as follows. A 3-inch by 3-inch soxhlet extracted cotton gauze pad was moistened with pesticide grade hexane and used to wipe the marked-off area in two directions; the second direction was at a 90° angle to the first direction. The gauze pad was re-moistened, as required, during sample collection as the

hexane volatilized before the entire sampling area could be wiped.

After wiping in both directions the gauze pad was folded with the sample surfaces facing inwards and placed in a clean glass sample jar. The sample jar was then sealed with a teflon-lined lid. A new pair of disposable gloves was used for each sample location.

2.4 TANKED LIQUID SAMPLING

2.4.1 General

Grab samples were collected from one of the two on-Site wash water storage tankers, to determine the appropriate disposition for this material. Because the source of decontamination wash water which was pumped to each tanker was the same, the contents of each tanker were presumed to be similar and thus, only one of the tankers was sampled. The collected samples were analyzed for PCBs, dioxins/furans, volatile organic compounds (VOCs), and base/neutral and acid extractables (BNAs).

2.4.2 Sample Collection

All tanked liquid samples were collected and transferred into individual sample bottles from a single common one-litre amber collection bottle. The collection bottle was strapped to the end of a clean wooden board and lowered approximately six inches beneath the water level in the tanker. After allowing the bottle to fill to approximately one-half of its capacity, the bottle was lowered to the bottom of the tanker and allowed to fill completely. By collecting the sample in this manner a "composite" sample, representative of liquid over the entire vertical depth of the tanker, was obtained. The sample collection bottle was removed from the tanker and the water transferred into the various bottles required for the individual analyses. Samples to be analyzed for PCBs, dioxins/furans, and BNAs were transferred into one-litre bottles, whereas samples to be analyzed for volatile organic compounds (VOCs) were transferred into 40-mil vials. The sample collection bottle was lowered repeatedly, as necessary, to collect sufficient liquid for analyses of all individual parameters.

3.0 SAMPLE PREPARATION AND HANDLING

3.1 EQUIPMENT DECONTAMINATION

All sampling equipment was decontaminated prior to sample collection in order to prevent cross-contamination of samples. Duplicate samples and samples submitted for matrix spikes were collected concurrently with the primary samples, therefore, sampling equipment was not decontaminated prior to collection of these samples.

Decontamination of sampling equipment was performed as follows:

1. clean water wash to remove all visible foreign matter;
2. rinse with deionized water;
3. rinse with reagent-grade acetone;
4. rinse with 1,1,1-trichloroethane; and
5. air dry on clean plastic or aluminum foil sheet.

Decontamination fluids and rinse waters used for cleaning the sampling equipment were not recycled. All wash water, rinse water, and decontamination fluids were collected in a plastic wash basin or pail during decontamination and transferred to a 55-gallon drum for on-Site storage.

3.2 SAMPLE HANDLING

Prior to sample collection, sample bottles were labelled with the following information:

1. project name - Crawfordsville;
2. job number - 1916;
3. date; and
4. sample identification number.

The time of sample collection and the sampler's initials were added to the label following sample collection. The label then was sealed to the bottle in clear plastic tape, the bottle lid was sealed with tape and the bottle was enclosed in a polyethylene zip-lock bag. Each sample was logged on a Chain of Custody Record Form and wrapped in packing material to prevent breakage. Samples were placed in a cooler packed with foam chips or newspaper to cushion the samples during shipment. Bags of ice or cooler packs were placed in the cooler with the samples. The completed Chain of Custody Record Form was sealed in a zip-lock bag and placed in the cooler. The cooler was sealed with fiberglass strapping tape and a CRA security seal was placed on the cooler prior to shipping.

Copies of the completed Chain of Custody Record Forms are included in Appendix A.

3.3 WASTE MATERIAL HANDLING

Solid waste materials generated during the sampling program, including Saranex-coated Tyvek coveralls, gloves, foil, and discarded ground sheets, were placed in 55-gallon drums or garbage bags. Full drums and garbage bags were secured and stored on Site in the interim storage cell.

3.4 SAMPLE DELIVERY

All samples were shipped by Federal Express overnight courier under approved chain of custody procedures.

4.0 ANALYTICAL PROTOCOLS

4.1 GENERAL

Two USEPA Contract Laboratory Program (CLP) laboratories were selected to perform the analyses required for the samples collected during the Phase II sampling and analysis program. Wadsworth-Alert Laboratories, located in Canton, Ohio, was selected to perform all chemical analyses with the exception of polychlorinated dioxins and furans. The analyses for dioxin/furan were performed by California Analytical Laboratories in Sacramento, California.

4.2 ANALYTICAL PROTOCOLS

The analytical protocols used for determining the targeted parameters are as listed on Table 4.1. The Laboratory Quality Assurance/Quality Control protocols used for these analyses were in accordance with CLP guidelines, where appropriate.

Only confirmatory soil and wipe samples sent to Wadsworth-Alert Laboratories were analyzed in strict accordance with CLP protocols. Quality assurance/quality control protocols, consistent with the intent of the CLP protocols, were followed for all other sample analyses.

TABLE 4.1

ANALYTICAL METHODS SUMMARY

Sample	Parameter	Method for Extraction/Cleanup	Method for Analyses
Soil/Sediment	Total PCBs	3540(1)/3550(1)	8080(1)
Groundwater	Total PCBs	3510/3520(1)	8080(1)
	Dioxin/Furan	8280	8280(1)
	Priority Pollutant Volatiles	5010/5020/5030(1)	8240(1)
Surface Wipe	Total PCBs	3540/3550(1)	8080(1)
Tanked Liquids	Total PCBs	3510/3520(1)	8080(1)
	Dioxin/Furan	8280	8280(1)
	Priority Pollutant Volatiles	5010/5020/5030(1)	8240(1)
	B/N/As	3540/3550(1)	8270(1)

Notes:

1. Test Methods for Evaluating Solid Waste - Physical/Chemical Methods, Second Edition, SW-846, United States Environmental Protection Agency, 1984.

2. Base, neutral and acid extractables compounds.

3. NIOSH Manual of Analytical Method, Volume 1, Third Edition, NIOSH Publication No. 84-100, U.S. Department of Health and Human Services.

All samples submitted to California Analytical Laboratories for dioxin/furan analyses were analyzed in strict accordance with Method 8280.

4.3 QUALITY ASSURANCE/QUALITY CONTROL OBJECTIVES

4.3.1 General

The overall QA/QC objective was to develop and implement procedures for field sampling, chain of custody, laboratory analysis and reporting that would provide accurate and precise data. Specific procedures for sampling, chain of custody, calibration, laboratory analyses, reporting, quality control, preventative maintenance and corrective actions are presented in other sections of this report.

The purpose of this section is to define the goals set for the level of QA effort; accuracy, precision and sensitivity of analyses; and completeness, representativeness, and comparability of measurement data from the analytical laboratories. In addition, QA objectives for field measurements are also discussed.

4.3.2 Level of QA Effort

To assess the quality of data resulting from the sampling program, field duplicate, field blank and duplicate matrix spike samples were collected and submitted to the analytical laboratories. Field blank samples were analyzed to check procedural contamination and/or ambient conditions and/or sample container contamination at the Site. Field duplicate samples were analyzed to check for sampling and analytical precision. Laboratory matrix spike samples were analyzed in duplicate at the same spike levels to check for analytical precision and analyte recovery. The specific level of field QA effort for this sampling program is presented in Section 5.8.

Where appropriate, soil and surface wipe samples collected at the Site were analyzed in a manner consistent with CLP RAS protocols. The level of laboratory QA effort for the samples analyzed in a manner consistent with the intent of CLP RAS protocols is specified in the appropriate CLP Statement of Work (SOW), SOW 985, Modification 10 for organics, SOW 784, Modification 7 for inorganics and Statement of Work for Dioxin Analyses, IFB AM.1 (12/29/83) for TCDD.

The methods employed for dioxin/furan analysis are summarized in Table 4.1. The level of

laboratory QA effort for dioxin/furan involved analysis of one preparation blank (liquid) at the time of analysis of investigative samples.

4.3.3 Accuracy, Precision and Sensitivity of Analyses

The fundamental QA objective with respect to accuracy, precision, and sensitivity of laboratory analytical data was to achieve the QC acceptance criteria of the analytical protocols. The accuracy and precision requirements for samples analyzed in a manner consistent with the CLP RAS protocols are specified in the appropriate CLP SOWs discussed in Section 4.3.2.

The accuracy and precision requirements for the stream sediment and soil quality parameters are in accordance with the specified EPA methods. Table 4.1 lists the analytical method references which were used for the water quality parameters.

4.3.4 Completeness, Representativeness and Comparability

As required by the USEPA, the samples analyzed for organics, inorganics and dioxin/furan were

analyzed in a manner consistent with CLP protocols. These protocols require that the data meet the QA/QC acceptance criteria for 95 percent of all samples tested. Completely valid data for water, stream sediment and soil quality parameters and physical parameters should also be provided. The reasons for any variances from completeness (i.e. data not within the acceptance QA/QC limits) is documented in Section 5.

5.0 DATA VALIDATION

5.1 GENERAL

The following sections discuss the validation of results reported by the contract laboratories in accordance with the previously established Quality Assurance Project Plan (QAPP) and subsequent amendments.

The evaluation of the analytical data was based on the information provided in the reports from both of the contract laboratories involved, including: field blank data, lab blank data, duplicate data, as well as recovery data from matrix and surrogate spikes. The analytical data was assessed for consistency, accuracy and precision based on the review of the recovery data as well as the comparability of the duplicate analyses.

The final analytical reports from both of the contract laboratories were also checked for legibility, completeness, correctness and the presence of necessary dates, initials and signatures.

5.2 DETECTION LIMITS

The targeted analytical detection limits for these samples as established in the QAPP were achieved with the exception of some of the soil and sediment samples as well as all the water samples.

Both the observed variability as well as the high reported detection limits may be attributed to the presence of elevated levels of the analytes in the samples. Whenever an analyte is present in the sample at levels which exceed the initial calibration range, the detection limit must be increased proportionally.

This is due to the dilution of the sample which is necessary to ensure that the chromatographic peaks fall within the established calibration range which results in a loss of ability to detect other analytes present at lower levels. Consequently, the adjustment is dependent upon the amount of analyte present, and varies accordingly. For example, a sample containing 3,600 mg/kg of Arochlor-1248 has a reported detection limit of 1,000 mg/kg for the remaining arochlors due to the thousand-fold dilution necessary to ensure that the highest peaks associated with Arochlor-1248 fall within the established calibration range.

5.3 HOLDING TIMES

Based on the specified methods, the following holding time requirements were applied:

PCBs:
- extraction within 14 days of collection
- analysis within 40 days of collection

VOCs:
- analysis of water samples within 10 days of collection
- analysis of soil samples within 7 days of collection

Dioxin/Furan:
- extraction within 15 days of collection
- analysis within 45 days of collection

The sample retention times were evaluated by comparing the sampling dates listed on the appropriate Chain of Custody forms with the dates of extraction and/or analysis reported by the laboratories.

All of the confirmatory PCB samples were extracted within the specified method holding time. However, the following investigative samples have holding time violations associated with them:

Parameter	Lab ID	Days to Extraction	USEPA Guideline	Days to Analysis	USEPA Guideline
PCBs	4774-52813	17	14	20	40
	4774-52814	17	14	20	40
	4774-52815	17	14	20	40
	4774-52816	17	14	20	40
	4774-52817	17	14	20	40
	4774-52818	17	14	20	40
	4774-52819	17	14	20	40
VOCs	4774-52820	-	-	11	10
	4774-52820	-	-	11	10
	4970-54541	-	-	12	10
	5938-59483	-	-	14	10
	5938-59485	-	-	13	10
	5938-59487	-	-	13	10
	5938-59489	-	-	13	10
	5938-59491	-	-	13	10
BNAs	4970-54544	10	7	10	40

It should be noted that the samples which were analyzed for PCB content but had their holding times exceeded must have all positive results flagged as being estimated only (J) and all detection limits also qualified as estimated (UJ). For the samples noted above that were analyzed for volatile organic content, the holding times were greater than the specified 7 days but less than 14 days and as such only the aromatic volatile compounds are required to be flagged as estimated (J).

5.4 MATRIX SPIKE/MATRIX SPIKE DUPLICATE ANALYSES

Based on the Matrix Spike/matrix Spike Duplicate (MS/MSD) data reported, the spiked samples generally yielded recoveries within the prescribed control limits, as well as acceptable reproducibility for most of the samples. Sample WP-3008 (of the confirmatory samples) had reported heptachlor and aldrin recoveries of 162 percent (established control limits for these compounds are 35 to 130 percent and 34 to 132 percent, respectively). However, no action is required to be taken on MS/MSD data alone to qualify an entire case. Various effects unique to each matrix may perturb instrument response for certain analytes, resulting in apparent recoveries outside the acceptable limits.

5.5 COMPOUND IDENTIFICATION

The contract laboratory responsible for the analysis of the samples for PCB content (Wadsworth/Alert Laboratories, Inc.) employed pattern recognition rather than retention time windows to identify individual Arochlor isomers.

5.6 LABORATORY/REAGENT BLANKS

Laboratory blank analyses are normally used to determine the existence and extent of any sample contamination problems associated with the analytical process.

The evaluation guidelines stipulate that laboratory reagent blanks contain less than the Contract Required Detection Limit (CRDL) of any Hazardous Substance List (HSL) compound with the exception of methylene chloride, acetone, 2-butanone and toluene, presumably due to their ubiquitous nature. In addition, the guidelines further state that if the blanks contain a concentration of less than five times the CRDL for any individual compound, then the concentration should be reported as "not detected" (ND) for that compound.

Based on this criteria, all of the laboratory/reagent blank samples analyzed by the contract laboratories associated with the confirmatory samples contained acceptable concentrations of all targeted compounds. Therefore, the associated sample data requires no qualifications or further comment.

However, four of the laboratory/reagent blank samples analyzed in conjunction with the investigative

samples had the following volatile organic compounds detected:

Lab ID	Compound Detected	Concentration (ug/L)	Detection Limit
90302	Methylene Chloride	7	5
	Acetone	15	10
90303	Acetone	13	10
90317	Methylene Chloride	11	5
	Acetone	21	10
90516	Methylene Chloride	6	5
	Acetone	25	5

However, according to the Functional Guidelines for Evaluating Organics Analyses, blanks must contain less than five times the CRDL of the common laboratory solvents such as methylene chloride, acetone and toluene. Consequently, since the four laboratory blank samples listed above have reported concentrations less than five times the detection limits, they may be considered in control and thus no further action is required.

5.7 SURROGATE RECOVERY

Wadsworth/Alert noted in their Quality Control Narrative included within their report, the base, neutral and acid extractable analyses for sample 54544

(CRA-WT-2032) had one surrogate recovery (tribromophenol) reported as 129 percent, which is outside of the USEPA Surrogate Spike Recovery Control Limits of 10-123 percent. However, since the criteria requires that two of the surrogates from each fraction must be in control, and that the third must be greater than 10 percent recovery, this sample may be considered in control and as such requires no further action.

All of the remaining surrogate spike recoveries reported were within the acceptable Control Limits for both water and soil and as such require no further comment.

5.8 FIELD QA/QC

Tables 5.1 and 5.2 provide a list of the blind duplicate and field blank samples submitted to the contract laboratories by CRA. The total number of field QA/QC samples submitted, by requested analysis, are as follows:

Sample Type	Blanks	Duplicates
Investigative	9	9
Confirmatory	3	4
TOTAL	12	13

TABLE 5.1

BLIND DUPLICATES

Matrix	Sample #	Identification	Parameters
Sediments	S-2036	Duplicate of SD-15W	PCB
	S-500W	Duplicate of SD-144W	PCB
	SD-2010A	Duplicate of SD-2005A	PCB
Soil	S-016K	Duplicate of S-015K	PCB
	S-028E	Duplicate of S-030E	PCB
	S-071I	Duplicate of S-070I	PCB
	S-071M	Duplicate of S-070M	PCB
	S-149I	Duplicate of S-148I	PCB
	S-2034	Duplicate of S-2002	PCB
	S-400A	Duplicate of S-152A	PCB, CDD/CDF
	S-2017A(1)	Duplicate of S-2015A	PCB
	SPN-2023(1)	Duplicate of SPN-2019	PCB
	WP-3007 (1)	Duplicate of WP-3000	PCB

Notes:

(1) Confirmatory samples

TABLE 5.2

FIELD BLANKS

Matrix	Sample #	Identification	Parameters
Sediments	S-2035	Blank for SD-15W	PCB
	SD-2009A	Blank for SD-2005A	PCB
Soil	S-017K	Blank for S-015K	PCB
	S-029E	Blank for S-030E	PCB
	S-073I	Blank for S-070I	PCB
	S-072M	Blank for S-070M	PCB
	S-150I	Blank for S-148I	PCB
	S-2033	Blank for S-2002	PCB
	S-301E	Blank for S-129E	PCB
	S-401A	Blank for S-152A	PCB, CDD/CDF
	S-2016A(1)	Blank for S-2015A	PCB
	WP-3009(1)	Blank for WP-3000	PCB

Notes:

(1) Confirmatory samples

The quality control samples were collected at a frequency greater than originally outlined in the QAPP. The data associated with the analysis of these samples is reported in Section 6.0 of this report.

5.8.1 Field Blanks

Generally, the field blanks submitted to the contract laboratories indicated no apparent sources of contamination of the samples via carry-over, sampling protocols, high ambient background or laboratory introduced contaminants. Field blank data is detailed as follows:

- one of the confirmatory soil field blank samples (S-2016A) contained 3.4 ug/L of Arochlor 1248. The remaining soil blanks contained no detectable Arochlors.

- one of the confirmatory wipe samples (WP-3009) contained 22 ug/100 cm^2 of Arochlor 1248 indicating a potential contamination problem with the wipe samples.

5.8.2 Field Duplicates

The analyses of field duplicates, submitted blind to Wadsworth/Alert Laboratories, indicate that the

laboratory generally provided data with acceptable precision. There were, however, some minor exceptions with a few of the associated samples.

Of the soil samples which had an associated duplicate sample, most had only one or two Arochlors detected at or near the reported detection limit. One investigative soil sample (S-148I) contained 4,800 mg/kg of Arochlor 1248. However, only 1,500 mg/kg was found in the duplicate sample (S-149I), while 1,600 mg/kg were detected in the associated matrix spike (S-151I) sample, indicating a potential problem with the analytical precision for sample S-148I. It should be noted, however, that it is difficult to ensure sample homogeneity when dealing with soil and sediment samples. Consequently, samples which are thought to be true duplicates may in fact be very different in nature. This may account for much of the variations in the data reported for duplicate soil and sediment samples.

5.9 OVERALL DATA ASSESSMENT

Based on the criteria outlined in the evaluation guidelines which were used to review the data generated, it is apparent that the data is acceptable, accurate and complete, with the exceptions and specific qualifications noted above.

As a result, with these qualifications and recommendations duly noted, this data may be used for its original intended purpose as outlined in the QAPP.

6.0 ANALYTICAL RESULTS

6.1 GENERAL

The results of the analytical program are presented in the following tables in Appendix B:

Table B-1 Investigative Soil Samples - PCB Concentrations

Table B-2 Investigative Soil Samples - Chlorinated Dibenzo-p-dioxins

Table B-3 Investigative Soil Samples - Chlorinated Dibenzofurans

Table B-4 Confirmatory Soil Samples - PCB Concentrations

Table B-5 Confirmatory Wipe Samples - PCB Concentrations

Table B-6 Wastewater Disposal Characterization - PCB Concentrations

Table B-7 Wastewater Disposal Characterization - Volatile Organic Compounds

Table B-8 Wastewater Disposal Characterization - Base Neutral Acid Extractable (BNA) Compounds

Table B-9 Wastewater Disposal Characterization - CDDs/CDFs

For the collected and analyzed soil and sediment samples, the reported concentrations of PCB and dioxin/furan are shown on Plan 2 and Plan 3, respectively.

6.2 SOIL AND SEDIMENT SAMPLES

6.2.1 Investigative PCB Samples

The analytical results for investigative samples for PCB analyses confirmed the finding from previous programs that PCB concentrations in the soil vary significantly throughout the Site.

At deep subsurface sampling locations, reported PCB concentrations typically decreased with increasing depth. Where a decrease in PCB concentration was observed over the vertical profile, the decrease was significant with the difference being one or more orders of magnitude. The only exception to this general trend occurred at sample location S-70, where the PCB concentration in the last sample zone was 40 mg/kg compared to non-detect in the above zone. At sample locations S-12, S-148 and S-30, elevated concentrations of PCB were detected in the lowest sampled zone at depth intervals of 5 to 5.5 feet, 6 to 6.5 feet, and 3 to 3.5 feet, respectively.

PCBs were detected in all the pipe bedding samples with the exception of the sample collected from location TT1. Concentrations in the two bedding samples collected immediately east of the plant slab were reported as 2 mg/kg and 330 mg/kg. The PCB concentrations which were

detected in the bedding for the underground pipe which ran from the below grade loading ramp (west side of plant slab) to the ravine, varied from 0.09 mg/kg to 1,100 mg/kg. The lower concentration was detected near the loading dock, whereas the highest concentration was detected at the ravine.

The PCB concentrations detected at each of the discharge zones of the pipes ending in the ravine varied significantly. The soil concentrations ranged from 1.3 mg/kg to 1,400 mg/kg of total PCB. The PCB concentration at the discharge zone for the pipe from the loading dock at the west side of the plant slab was reported as 25 mg/kg.

PCBs were detected in all of the analyzed samples collected from the ravine bottom and floodplain bank. The distribution of PCB concentrations across the width of the ravine bottom was variable; no distribution pattern could be determined from the data. Detected PCB concentrations ranged from 1 mg/kg to 1,800 mg/kg. The data did not show any clear trend in PCB concentrations along the length of the ravine bottom.

6.2.2 Investigative CDD/CDF Samples

Total dioxin and furan concentrations in the analyzed soil samples ranged from non-detect to 1.28 ug/kg and from non-detect to 24.6 ug/kg, respectively. The dioxin concentrations were comparable to the concentrations which were reported during previous programs for soils. Positive detections for dioxins were only found for the hepta and octa homologue classes. Furan concentrations were more variable than the dioxin concentrations and results were reported for each of the homologue classes.

6.2.3 Confirmatory PCB Samples

All the confirmatory soil samples which were analyzed showed detectable concentrations of PCBs.

Within the excavation area in the yard designated as Area II-B, PCB concentrations ranged from 0.5 to 2,600 mg/kg at the base of the excavated area. Reported concentrations at the base of the deepest excavation sub-area were 0.5 and 17 mg/kg. The residual PCB results for the shallowest and the intermediate depth sub-areas are 2,600 mg/kg and 1.3 mg/kg, respectively. PCB concentrations in the soil stockpiled from the lower 1-foot depth interval of the excavation were detected at 320 and 420 mg/kg.

Residual concentrations of PCBs from the base of the excavation over Area II-A were detected at elevated concentrations. The PCB concentrations ranged from 780 mg/kg to 23,000 mg/kg.

6.3 DISPOSAL CHARACTERIZATION SAMPLES

6.3.1 Wipe Samples

Wipe samples collected from the dismantled pump and casing indicated PCB concentrations were present in total concentrations ranging from non-detect to 66.5 ug/cm^2. The analytical results showed that only Arochlors 1248 and 1254 were present. These results will be used to determine the subsequent disposal of the dismantled parts.

6.3.2 Tanked Wastewater Samples

The analyses for the tanked wastewaters detected PCBs and identified various other organic compounds. These results were subsequently used to determine the appropriate disposition of the tanked wastewaters.

7.0 HEALTH AND SAFETY

Sample collection during the investigative program involved contact with soils that potentially contained residual levels of PCBs and other compounds. All sampling activities were conducted in accordance with the provisions of the Health and Safety Plan presented within the Phase II Response Action Work Plan. The Health and Safety Plan ensured a safe and minimal risk work environment for sampling personnel and minimized the potential for impact from sampling activities on the public and the environment.

All personnel on Site for the sampling program were capable of and familiar with the use of safety, health, respiratory and protective equipment, and with the safety and security procedures required for the Site.

All sampling personnel were equipped with the following protective clothing and equipment in accordance with USEPA Level C requirements:

1. Full-face air purifying respirator equipped with MSHA/NIOSH approved high efficiency cartridges for particulates and organic vapors;

2. Disposable, splash-resistant, chemical-resistant Tyvek coveralls;

3. Disposable nitrile gloves and disposable latex gloves;

4. Boots, chemical resistant, steel-toe and shank; and

5. Chemical resistant rubber overboots.

All sampling personnel had passed a required respiratory fit test before entering the Exclusion Zone to begin sampling.

8.0 REFERENCES

Conestoga-Rovers & Associates. 1986a. Initial Site Screening: Sampling Program, Former P.R. Mallory Plant Site, Crawfordsville, Indiana. Prepared for Duracell International Inc. September 1986.

Conestoga-Rovers & Associates. 1986b. Response Action Work Plan, Former P.R. Mallory Plant Site, Crawfordsville, Indiana. Prepared for Duracell International Inc. October 1986.

Conestoga-Rovers & Associates. 1987a. Phase I Remedial Action Report, Former P.R. Mallory Plant Site, Crawfordsville, Indiana. Prepared for Duracell International Inc. February 1987.

Conestoga-Rovers & Associates. 1987b. Hydrogeologic Investigation Interim Report, Former P.R. Mallory Plant Site, Crawfordsville, Indiana. Prepared for Duracell International Inc. March 1987.

Conestoga-Rovers & Associates. 1987c. Phase I Samplng and Analysis/Report, Former P.R. Mallory Plant Site, Crawfordsville, Indiana. Prepared for Duracell International Inc. April 1987.

Conestoga-Rovers & Associates. 1987d. Hydrogeological Investigation Supplemental Data Report, Former P.R. Mallory Plant Site, Crawfordsville, Indiana. Prepared for Duracell International Inc. July 1987.

Conestoga-Rovers & Associates. 1987e. Phase I Supplemental Sampling and Analysis Report, Former P.R. Mallory Plant Site, Crawfordsville, Indiana. Prepared for Duracell International Inc. September 1987.

Conestoga-Rovers & Associates. 1987f. Phase II Response Action Work Plan, Former P.R. Mallory Plant Site, Crawfordsville, Indiana. Prepared for Duracell International Inc. November, 1987.

Conestoga-Rovers & Associates. 1988a. Phase II Remedial Action Report, Former P.R. Mallory Plant Site, Crawfordsville, Indiana. Prepared for Duracell International Inc. September 1988.

Conestoga-Rovers & Associates. 1988b. Phase II Hydrogeological Investigation, Former P.R. Mallory Plant Site, Crawfordsville, Indiana. Prepared for Duracell International Inc. September 1988.

APPENDIX A

CHAIN OF CUSTODY RECORD FORMS

CRA Consulting Engineers
CONESTOGA-ROVERS & ASSOCIATES
651 Colby Drive, Waterloo, Ontario Canada N2V 1C2

SHIPPED TO (Laboratory name): [redacted] WADSWORTH

CHAIN OF CUSTODY RECORD

PROJECT Nº: 1916

PROJECT NAME: CRAWFORDSVILLE

SAMPLER'S SIGNATURE: Jay Churchill (SIGN)

SEQ. Nº	SAMPLE Nº	DATE	TIME	SAMPLE LOCATOIN	SAMPLE TYPE	Nº OF CONTAINERS	ANALYSIS [redacted] REQUIRED
1916-	SUMP 1-A	2-9-88	3:30 P.M.	250 ml CLEAR JAR	SOIL	1	PCBs
1916-	SUMP 1-B	↓	3:35 P.M.	↓	↓	1	↓
1916-	SUMP-2A		1800			1	
1916-	SUMP-2B	↓	1815			1	
1916-	SUMP-3A	2-10-88	1630			1	
1916-	SUMP-3B	2-10-88	1645	↓	↓	1	↓
				TOTAL NUMBER OF CONTAINERS		6	

ANTICIPATED CHEMICAL HAZARDS:

RELINQUISHED BY:	DATE/TIME	RECEIVED BY:
1 Jay Churchill (SIGN)	Feb 11/88 7:00 AM	2 (SIGN)
RELINQUISHED BY: 2 (SIGN)	DATE/TIME	RECEIVED BY: 3 (SIGN)
RELINQUISHED BY: 3 (SIGN)	DATE/TIME	RECEIVED BY: 4 (SIGN)
ADDITIONAL SIGNATURE SHEET REQUIRED ☐		

METHOD OF SHIPMENT:	SHIPPED BY:	RECEIVED FOR LABORATORY BY: (SIGN)	DATE/TIME
FED. EX.	J.L.		
CONDITION OF SEAL UPON RECEIPT: GENERAL CONDITION OF COOLER:		COOLER OPENED BY: (SIGN)	DATE/TIME

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CONESTOGA-ROVERS & ASSOCIATES
651 Colby Drive, Waterloo, Ontario Canada N2V 1C2

SHIPPED TO (Laboratory name): WADSWORTH / ALERT LABS

CHAIN OF CUSTODY RECORD

PROJECT Nº: 1916

PROJECT NAME: CRAWFORDSVILLE

SAMPLER'S SIGNATURE: Jay Churchill (SIGN)

SEQ. NO.	SAMPLE Nº.	DATE	TIME	~~SAMPLE LOCATION~~	SAMPLE TYPE	Nº OF CONTAINERS	ANALYSIS ~~REMARKS~~ REQUIRED
	CRA-B-070G	2/23/88	1030	CLEAR 250 mL JAR	SOIL	1	PCBs (METHOD SW-846)
	CRA-B-070H		1040			1	
	CRA-B-070I		1050			1	
	CRA-B-071I		1051			1	
	CRA-B-072I		1052			1	PCBs MATRIX SPIKE
	CRA-B-073I		1049	1 LITRE AMBER	WATER	1	PCBs (METHOD SW-846)
	CRA-B-021E		1115	CLEAR 250 mL JAR	SOIL	1	
	CRA-B-021F		1125			1	
	CRA-B-021G		1135			1	
	CRA-B-012E		1200			1	
	CRA-B-012F		1210			1	
	CRA-B-012G		1220			1	
	CRA-B-027E		1330			1	
	CRA-B-027F		1345			1	
	CRA-B-027G		1355			1	
	CRA-B-028E		1331			1	
	CRA-B-029E		1329	1 LITRE AMBER	WATER	1	
	CRA-B-015C		1500	CLEAR 250 mL JAR	SOIL	1	
	CRA-B-015D		1515	"	SOIL	1	
				TOTAL NUMBER OF CONTAINERS		19	

ANTICIPATED CHEMICAL HAZARDS: PCBs

RELINQUISHED BY: [1] Jay Churchill (SIGN)	DATE/TIME FEB. 24/88 12:00 P.M.	RECEIVED BY: ② (SIGN)
RELINQUISHED BY: [2] (SIGN)	DATE/TIME	RECEIVED BY: ③ (SIGN)
RELINQUISHED BY: [3] (SIGN)	DATE/TIME	RECEIVED BY: ④ (SIGN)
ADDITIONAL SIGNATURE SHEET REQUIRED ☐		

METHOD OF SHIPMENT: FED. EX.	SHIPPED BY: J.L.	RECEIVED FOR LABORATORY BY: (SIGN)	DATE/TIME
CONDITION OF SEAL UPON RECEIPT: GENERAL CONDITION OF COOLER:		COOLER OPENED BY: (SIGN)	DATE/TIME

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CHAIN OF CUSTODY RECORD

PROJECT Nº: 1916

PROJECT NAME: CRAWFORDSVILLE

SAMPLER'S SIGNATURE: Jay Churchill (SIGN)

SAMPLE Nº	DATE	TIME	~~SAMPLE LOCATION~~	SAMPLE TYPE	Nº OF CONTAINERS	ANALYSIS ~~REMARKS~~ REQUIRED
CRA-B-015E	2/23/88	1530	CLEAR 250 mL JAR	SOIL	1	PCBs (METHOD SW8-46)
CRA-B-088E	↓	1540	↓	↓	1	↓
CRA-B-088F		1550			1	
CRA-B-088G		1600			1	
			TOTAL NUMBER OF CONTAINERS		4	

ANTICIPATED CHEMICAL HAZARDS: PCBs

RELINQUISHED BY: [1] Jay Churchill (SIGN)	DATE/TIME FEB. 24/88 12:00 P.M.	RECEIVED BY: ② (SIGN)
RELINQUISHED BY: [2] (SIGN)	DATE/TIME	RECEIVED BY: ③ (SIGN)
RELINQUISHED BY: [3] (SIGN)	DATE/TIME	RECEIVED BY: ④ (SIGN)
ADDITIONAL SIGNATURE SHEET REQUIRED ☐		

METHOD OF SHIPMENT: FED. EX.	SHIPPED BY: J.L.	RECEIVED FOR LABORATORY BY: (SIGN)	DATE/TIME
CONDITION OF SEAL UPON RECEIPT: GENERAL CONDITION OF COOLER:		COOLER OPENED BY: (SIGN)	DATE/TIME

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651 Colby Drive, Waterloo, Ontario Canada N2V 1C2

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CHAIN OF CUSTODY RECORD

PROJECT Nº: 1916

PROJECT NAME: CRAWFORDSVILLE

SAMPLER'S SIGNATURE: Jay Churchill (SIGN)

SEQ. Nº	SAMPLE Nº	DATE	TIME	~~BOTTLE TYPE~~ SAMPLE LOCATION	SAMPLE TYPE	Nº OF CONTAINERS	ANALYSIS ~~REMARKS~~ REQUIRED
CRA	80-2005A	2/26/88	1401	250 ml CLEAR JAR	SOIL	1	PCBs (CLP)
CRA	80-2005B	↓	1445	↓	↓	1	PCBs (CLP) (EXTRACT HOLD)
"	"-2006A		1700			1	PCBs (CLP)
"	"-2007A		1100			1	PCBs (CLP)
"	"-2008A		1500			1	PCBs (CLP)
"	"-2008B		1510	↓	↓	1	PCBs (CLP) (EXTRACT. HOLD)
"	"-2009A		1400	1 LITRE AMBER JAR	WATER	1	PCBs (CLP)
"	"-2010A		1402	250 ml CLEAR JAR	SOIL	1	PCBs (CLP)
"	"-2011A		1600	↓	↓	1	PCBs (CLP)
"	"-2011B	↓	1610	↓	↓	1	PCBs (CLP) (EXTRACT. HOLD)
				TOTAL NUMBER OF CONTAINERS		10	

ANTICIPATED CHEMICAL HAZARDS: PCBs.

RELINQUISHED BY: [1] Jay Churchill (SIGN)	DATE/TIME Feb. 29/88 5:00 p.m.	RECEIVED BY: ② (SIGN)
RELINQUISHED BY: [2] (SIGN)	DATE/TIME	RECEIVED BY: ③ (SIGN)
RELINQUISHED BY: [3] (SIGN)	DATE/TIME	RECEIVED BY: ④ (SIGN)
ADDITIONAL SIGNATURE SHEET REQUIRED ☐		

METHOD OF SHIPMENT: FED. EX.	SHIPPED BY: J. C.	RECEIVED FOR LABORATORY BY: (SIGN)	DATE/TIME
CONDITION OF SEAL UPON RECEIPT: GENERAL CONDITION OF COOLER:		COOLER OPENED BY: (SIGN)	DATE/TIME

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651 Colby Drive, Waterloo, Ontario Canada N2V 1C2

SHIPPED TO (Laboratory name): WADSWORTH / ALERT LABS

CHAIN OF CUSTODY RECORD

PROJECT Nº: 1916

PROJECT NAME: CRAWFORDSVILLE

SAMPLER'S SIGNATURE: Jay Clendenin (SIGN)

SEQ. Nº	SAMPLE Nº	DATE	TIME	~~SAMPLE LOCATION~~ BOTTLE TYPE	SAMPLE TYPE	Nº OF CONTAINERS	~~REMARKS~~ ANALYSIS REQUIRED
	CRA-S-2012A	3/1/88	0945	250 ml CLEAR	SOIL	1	PCBs (CLP)
	CRA-S-2013A	2/29/88	1930	↓	↓	1	PCBs (CLP)
	CRA-S-2014A	3/1/88	0930	↓	↓	1	PCBs (CLP)
	CRA-S-2015A	2/29/88	1907	↓	↓	1	PCBs (CLP)
	CRA-S-2016A	2/29/88	1900	1 LITRE AMBER	WATER	1	PCBs (CLP)
	CRA-S-2017A	2/29/88	1906	250 ml CLEAR	SOIL	1	PCBs (CLP)
	CRA-S-2018A	2/29/88	1905	[redacted] ↓	↓	1	PCBs (MATRIX SPIKE) (CLP)
	CRA-S-2001	2/29/88	1130	↓	↓	1	PCBs (METHOD SW4-46)
	CRA-S-2024	3/2/88	1215	250 ml CLEAR	SOIL	1	PCBs (METHOD SW4-46)
				TOTAL NUMBER OF CONTAINERS		9	

ANTICIPATED CHEMICAL HAZARDS: PCBs

RELINQUISHED BY: [1] Jay Clendenin (SIGN)	DATE/TIME March 2/88 5:00 p.m.	RECEIVED BY: ② (SIGN)
RELINQUISHED BY: [2] (SIGN)	DATE/TIME	RECEIVED BY: ③ (SIGN)
RELINQUISHED BY: [3] (SIGN)	DATE/TIME	RECEIVED BY: ④ (SIGN)
ADDITIONAL SIGNATURE SHEET REQUIRED ☐		

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651 Colby Drive, Waterloo, Ontario Canada N2V 1C2

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CHAIN OF CUSTODY RECORD

PROJECT Nº: 1916

PROJECT NAME: CRAWFORDSVILLE

SAMPLER'S SIGNATURE: [signature] (SIGN)

SEQ. Nº.	SAMPLE Nº.	DATE	TIME	~~SAMPLE LOCATION~~ BOTTLE TYPE	SAMPLE TYPE	Nº OF CONTAINERS	~~REMARKS~~ ANALYSIS REQUIRED
	CRA-WT-2028	3/3/88	1803	1L AMBER	WATER	2	DIOXIN/FURAN (NON-CLP)
				TOTAL NUMBER OF CONTAINERS		2	

ANTICIPATED CHEMICAL HAZARDS: PCBs

RELINQUISHED BY: 1 [signature] (SIGN)	DATE/TIME March 4/88 5:00 p.m.	RECEIVED BY: 2 (SIGN)
RELINQUISHED BY: 2 (SIGN)	DATE/TIME	RECEIVED BY: 3 (SIGN)
RELINQUISHED BY: 3 (SIGN)	DATE/TIME	RECEIVED BY: 4 (SIGN)
ADDITIONAL SIGNATURE SHEET REQUIRED ☐		

METHOD OF SHIPMENT: FED. EX.	SHIPPED BY: J.L.	RECEIVED FOR LABORATORY BY: (SIGN)	DATE/TIME
CONDITION OF SEAL UPON RECEIPT: GENERAL CONDITION OF COOLER:		COOLER OPENED BY: (SIGN)	DATE/TIME

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651 Colby Drive, Waterloo, Ontario Canada N2V 1C2

SHIPPED TO (Laboratory name): WADSWORTH / ALERT

CHAIN OF CUSTODY RECORD

PROJECT Nº: 1916

PROJECT NAME: FORMER P.R. MALLORY PLANT SITE CRAWFORDSVILLE, IND.

SAMPLER'S SIGNATURE: Jay Churchill (SIGN)

SEQ. Nº	SAMPLE Nº	DATE	TIME	~~SAMPLE LOCATION~~ BOTTLE TYPE	SAMPLE TYPE	Nº OF CONTAINERS	REMARKS
1	CRA-S-TT5	5 MAR	11:30	250 ml CLEAR	SOIL	1	PCB (METHOD SW-846)
2	CRA-S-TT6	5 MAR	12:30		SOIL	1	PCB (METHOD SW-846)
3	CRA-SPN-201A	MARCH 7/88	1100		SOIL	1	PCB [redacted] (CLP)
4	CRA-SPE-2022	↓	1200		↓	1	PCB (CLP)
5	CRA-SPN-2023	↓	1115			1	PCB (CLP)
6	CRA-S-2002	MARCH 8/88	1015			1	PCB (METHOD SW-846)
7	CRA-S-2003	↓	1030			1	PCB (METHOD SW-846)
8	CRA-S-2004		1045	↓	↓	1	PCB (METHOD SW-846)
9	CRA-S-2033		1014	1 L AMBER	WATER	1	PCB (METHOD SW-846)
10	CRA-S-2034	↓	1016	250 ml CLEAR	SOIL	1	PCB (METHOD SW-846)
				TOTAL NUMBER OF CONTAINERS		10	

ANTICIPATED CHEMICAL HAZARDS: PCB

RELINQUISHED BY: [1] Jay Churchill (SIGN)	DATE/TIME: MARCH 8/88 5:00 P.M.	RECEIVED BY: [2] (SIGN)
RELINQUISHED BY: [2] (SIGN)	DATE/TIME:	RECEIVED BY: [3] (SIGN)
RELINQUISHED BY: [3] (SIGN)	DATE/TIME:	RECEIVED BY: [4] (SIGN)
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CHAIN OF CUSTODY RECORD

PROJECT Nº: 1916

PROJECT NAME: CRAWFORDSVILLE

SAMPLER'S SIGNATURE: Jay Churchill (SIGN)

SEQ. Nº	SAMPLE Nº	DATE	TIME	~~BOTTLE TYPE~~ ~~SAMPLE LOCATION~~	SAMPLE TYPE	Nº OF CONTAINERS	ANALYSIS ~~REMARKS~~ REQUIRED
	CRA-B0-015B	3/8/88	1630	250 ml CLEAR	SOIL	1	PCB (METHOD SWA-46)
	CRA-B0-015C	3/8/88	1800	250 ml CLEAR	SOIL	1	PCB (METHOD SWA-46)
	CRA-B-015E	3/9/88	1030	↓		1	↓
	CRA-B-015W	↓	1000	↓		1	
	CRA-B-2035		0959	1 L AMBER	WATER	1	
	CRA-B-2036		1001	250 ml CLEAR	SOIL	1	↓
	CRA-B-2037		1002	↓	↓	1	PCB (MATRIX SPIKE)
	CRA-B-019E		1400			1	PCB (METHOD SWA-46)
	CRA-B-019W	↓	1410	↓	↓	1	PCB (METHOD SWA-46)
				TOTAL NUMBER OF CONTAINERS		9	

ANTICIPATED CHEMICAL HAZARDS:

RELINQUISHED BY: [1] Jay Churchill (SIGN)	DATE/TIME MARCH 10/88 5:00 P.M.	RECEIVED BY: [2] (SIGN)
RELINQUISHED BY: [2] (SIGN)	DATE/TIME	RECEIVED BY: [3] (SIGN)
RELINQUISHED BY: [3] (SIGN)	DATE/TIME	RECEIVED BY: [4] (SIGN)
ADDITIONAL SIGNATURE SHEET REQUIRED ☐		

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SHIPPED TO (Laboratory name): WADSWORTH / ALERT

CHAIN OF CUSTODY RECORD

PROJECT Nº. 1916

PROJECT NAME : CRAWFORDSVILLE

SAMPLER'S SIGNATURE _____ (SIGN)

SEQ. Nº.	SAMPLE Nº.	DATE	TIME	~~BOTTLE TYPE~~ ~~SAMPLE LOCATION~~	SAMPLE TYPE	Nº. OF CONTAINERS	ANALYSIS ~~REMARKS~~ REQUIRED
CRA	WP-3000	3/10/88	0950	300 ml GLASS	WIPE	1	PCBs (C&P)
"	"-3001	"	1000	"	"	1	" "
"	"-3002	"	1010	"	"	1	" "
"	"-3003	"	1020	"	"	1	" "
"	"-3004	"	1030	"	"	1	" "
"	"-3005	"	1040	"	"	1	" "
"	"-3006	"	1050	"	"	1	" "
"	"-3007	"	0951	"	"	1	" "
"	"-3008	"	0952	"	"	1	(EXTRA SPIKE)
"	"-3009	"	0943	"	"	1	"
"	"-3010	"	1100	"	"	1	"
"	"-3011	"	1110	"	"	1	" "
				TOTAL Nº. OF CONTAINERS		12	

RELINQUISHED BY: 1 _____ (SIGN)	DATE / TIME March 10/88 5:00 p.m.	RECEIVED BY: 2 _____ (SIGN)
RELINQUISHED BY: 2 _____ (SIGN)	DATE / TIME _____ / _____	RECEIVED BY: 3 _____ (SIGN)
RELINQUISHED BY: 3 _____ (SIGN)	DATE / TIME _____ / _____	RECEIVED BY: 4 _____ (SIGN)
RELINQUISHED BY: 4 _____ (SIGN)	DATE / TIME _____ / _____	RECEIVED BY: 5 _____ (SIGN)

METHOD OF SHIPMENT: FED. EX.	SHIPPED BY: J.L.	RECEIVED FOR LABORATORY BY: (SIGN) _____	DATE / TIME _____ / _____
CONDITION OF SEAL UPON RECEIPT: GENERAL CONDITION OF COOLER:		COOLER OPENED BY: (SIGN) _____	DATE / TIME _____ / _____

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CHAIN OF CUSTODY RECORD

PROJECT Nº: 1916

PROJECT NAME: CRAWFORDSVILLE

SAMPLER'S SIGNATURE: Jay Churchill (SIGN)

SEQ. Nº	SAMPLE Nº	DATE	TIME	~~SAMPLE LOCATION~~ BOTTLE TYPE	SAMPLE TYPE	Nº OF CONTAINERS	ANALYSIS ~~REMARKS~~ REQUIRED
CRA	-8-142C	4/25/88	1330	300 ml CLEAR	SOIL	1	PCBs
CRA-	8-142D	↓	1340	↓	↓	1	↓
	-142F		1350			1	(HOLD)
	-142H		1400			1	(HOLD)
	-142J		1410			1	(HOLD)
	-070K		1430			1	
	-070M		1441			1	
	-070O		1450			1	(HOLD)
	-070Q		1500			1	(HOLD)
	-071M		1442			1	
	-073M		1443	↓	↓	1	(MATRIX SPIKE)
	-072M		1440	1L AMBER	WATER	1	
	-148E		1800	300 ml CLEAR	SOIL	1	
	-148G		1810	↓	↓	1	
	-148I		1831			1	
	-148K		1845			1	(HOLD)
	-148M		1900			1	(HOLD)
	-148O		1915			1	(HOLD)
	-149I	↓	1832	↓	↓	1	↓
				TOTAL NUMBER OF CONTAINERS		19	

ANTICIPATED CHEMICAL HAZARDS: PCBs

RELINQUISHED BY: [1] Jay Churchill (SIGN)	DATE/TIME APRIL 27/88 5:00 AM.	RECEIVED BY: ② (SIGN)
RELINQUISHED BY: [2] (SIGN)	DATE/TIME	RECEIVED BY: ③ (SIGN)
RELINQUISHED BY: [3] (SIGN)	DATE/TIME	RECEIVED BY: ④ (SIGN)
ADDITIONAL SIGNATURE SHEET REQUIRED ☐		

METHOD OF SHIPMENT: FED. EX.	SHIPPED BY: J. L.	RECEIVED FOR LABORATORY BY: (SIGN)	DATE/TIME
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CHAIN OF CUSTODY RECORD

PROJECT Nº: 1916

PROJECT NAME: CRAWFORDSVILLE

SAMPLER'S SIGNATURE: Joy Churchill (SIGN)

SEQ. Nº	SAMPLE Nº	DATE	TIME	~~BOTTLE TYPE SAMPLE LOCATOIN~~	SAMPLE TYPE	Nº OF CONTAINERS	~~ANALYSIS REMARKS~~ REQUIRED
	CRA-8-151I	4/25/88	1833	300 ml CLEAR	SOIL	1	PCBs (~~WATER~~ FIRE)
	CRA-8-150I	4/25/88	1830	1L AMBER	WATER	1	PCBs
				TOTAL NUMBER OF CONTAINERS		2	

ANTICIPATED CHEMICAL HAZARDS: PCBs

RELINQUISHED BY: 1 Joy Churchill (SIGN)	DATE/TIME APRIL 27/88 5:00 P.M.	RECEIVED BY: 2 (SIGN)
RELINQUISHED BY: 2 (SIGN)	DATE/TIME	RECEIVED BY: 3 (SIGN)
RELINQUISHED BY: 3 (SIGN)	DATE/TIME	RECEIVED BY: 4 (SIGN)
ADDITIONAL SIGNATURE SHEET REQUIRED ☐		

METHOD OF SHIPMENT: FED. EX.	SHIPPED BY: J.L.	RECEIVED FOR LABORATORY BY: (SIGN)	DATE/TIME
CONDITION OF SEAL UPON RECEIPT: GENERAL CONDITION OF COOLER:		COOLER OPENED BY: (SIGN)	DATE/TIME

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CHAIN OF CUSTODY RECORD

PROJECT Nº: 1916

PROJECT NAME: CRAWFORDSVILLE

SAMPLER'S SIGNATURE: Jay Churchill (SIGN)

SEQ. Nº	SAMPLE Nº	DATE	TIME	~~BOTTLE TYPE~~ SAMPLE LOCATOIN	SAMPLE TYPE	Nº OF CONTAINERS	ANALYSIS ~~REMARKS~~ REQUIRED
	CRA-B-011E	4/29/88	1145	300 ml CLEAR	SOIL	1	PCBs
	CRA-B-011G		1200			1	
	-011I		1215			1	
	-011K		1230			1	(HOLD)
	-011M		1245			1	(HOLD)
	-012I		1400			1	
	-012K		1415			1	
	-012M		1430			1	(HOLD)
	-012O		1445			1	(HOLD)
	-015G		1600			1	
	-015I		1615			1	
	-015K		1631			1	(HOLD)
	-015M		1645			1	(HOLD)
	-016K		1632			1	(HOLD)
	-017K		1630	1 L AMBER	WATER	1	(HOLD)
	-018K		1633	300 ml CLEAR	SOIL	1	(MATRIX SPIKE) (HOLD)
	-021I		1030			1	
	-021K		1045			1	
	-021M		1100			1	(HOLD)
				TOTAL NUMBER OF CONTAINERS		19	

ANTICIPATED CHEMICAL HAZARDS: PCBs

RELINQUISHED BY: [1] Jay Churchill (SIGN)	DATE/TIME: May 2/88 12:00 RA.	RECEIVED BY: [2] (SIGN)
RELINQUISHED BY: [2] (SIGN)	DATE/TIME:	RECEIVED BY: [3] (SIGN)
RELINQUISHED BY: [3] (SIGN)	DATE/TIME:	RECEIVED BY: [4] (SIGN)
ADDITIONAL SIGNATURE SHEET REQUIRED ☐		

METHOD OF SHIPMENT: FED. EX.	SHIPPED BY: J.L.	RECEIVED FOR LABORATORY BY: (SIGN)	DATE/TIME
CONDITION OF SEAL UPON RECEIPT: GENERAL CONDITION OF COOLER:		COOLER OPENED BY: (SIGN)	DATE/TIME

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SHIPPED TO (Laboratory name): WADSWORTH / ALERT

CHAIN OF CUSTODY RECORD

PROJECT Nº: 1916

PROJECT NAME: CRAWFORDSVILLE

SAMPLER'S SIGNATURE: Jay Chandler (SIGN)

SEQ. Nº	SAMPLE Nº	DATE	TIME	~~BOTTLE TYPE~~ ~~SAMPLE LOCATION~~	SAMPLE TYPE	Nº OF CONTAINERS	ANALYSIS ~~REMARKS~~ REQUIRED
	CRA-B-021C	4/29/88	1115	300 ml [redacted]	SOIL	1	PCBs (HOLD)
	CRA-B-086E	↓	1845	↓	↓	1	PCBs
	-086G		1900			1	
	-200B		0930			1	
	-200D		0945			1	
	-200F		1000			1	(HOLD)
	-200H	↓	1015			1	(HOLD)
	-TT7	4/30/88	0930			1	
	-TT8	↓	1000			1	
	-TT13A		1710			1	
	-TT13B	↓	1715	↓	↓	1	↓
				TOTAL NUMBER OF CONTAINERS		11	

ANTICIPATED CHEMICAL HAZARDS: PCBs

RELINQUISHED BY: [1] Jay Chandler (SIGN)	DATE/TIME MAY 2/88 12:00 P.M.	RECEIVED BY: [2] (SIGN)
RELINQUISHED BY: [2] (SIGN)	DATE/TIME	RECEIVED BY: [3] (SIGN)
RELINQUISHED BY: [3] (SIGN)	DATE/TIME	RECEIVED BY: [4] (SIGN)
ADDITIONAL SIGNATURE SHEET REQUIRED ☐		

METHOD OF SHIPMENT: FED. EX.	SHIPPED BY: J.L.	RECEIVED FOR LABORATORY BY: (SIGN)	DATE/TIME
CONDITION OF SEAL UPON RECEIPT: GENERAL CONDITION OF COOLER:		COOLER OPENED BY: (SIGN)	DATE/TIME

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SHIPPED TO (Laboratory name): ENSECO - CAL LAB

CHAIN OF CUSTODY RECORD

PROJECT Nº: 1916

PROJECT NAME: CRAWFORDSVILLE

SAMPLER'S SIGNATURE: Jay Cleveland (SIGN)

SEQ. Nº	SAMPLE Nº	DATE	TIME	~~SAMPLE LOCATION~~ BOTTLE TYPE	SAMPLE TYPE	Nº OF CONTAINERS	~~ANALYSIS REMARKS~~ REQUIRED
	CRA-B-038A	5/2/88	1315	300 mL CLEAR	SOIL	1	DIOXINS/FURANS
	CRA-B-038B		1330			1	
	-152A		1401			1	
	-032A		1430			1	
	-021B		1445			1	
	-013B		1500			1	
	-079A		1515			1	
	-015B		1615			1	
	-088A		1600			1	
	-400A		1402			1	
	-402A		1403			1	(MATRIX SPIKE)
	-401A		1400	1 L AMBER	WATER	1	
				TOTAL NUMBER OF CONTAINERS		12	

ANTICIPATED CHEMICAL HAZARDS: PCBs, DIOXINS/FURANS

RELINQUISHED BY: [1] Jay Cleveland (SIGN)	DATE/TIME MAY 3/88 12:00 P.M.	RECEIVED BY: [2] (SIGN)
RELINQUISHED BY: [2] (SIGN)	DATE/TIME	RECEIVED BY: [3] (SIGN)
RELINQUISHED BY: [3] (SIGN)	DATE/TIME	RECEIVED BY: [4] (SIGN)
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SHIPPED TO (Laboratory name): WADSWORTH / ALERT LABS

CHAIN OF CUSTODY RECORD

PROJECT Nº: 1916

PROJECT NAME: CRAWFORDSVILLE

SAMPLER'S SIGNATURE: Jay Cherniak (SIGN)

SEQ. Nº	SAMPLE Nº	DATE	TIME	~~SAMPLE LOCATION~~ BOTTLE TYPE	SAMPLE TYPE	Nº OF CONTAINERS	ANALYSIS ~~REMARKS~~ REQUIRED
CRA	-8-129E	5/2/88	1005	300 ml CLEAR	SOIL	1	PCBs
CRA	-8-144E	↓	1800	↓	↓	1	↓
	-144W		1815			1	
	-505E		1830			1	
	-510E		1845			1	
	-515E		1900			1	
	-500W		1816			1	
	-501W		1817	↓	↓	1	(MATRIX SPIKE)
	-301E	↓	1000	1L AMBER	WATER	1	↓
				TOTAL NUMBER OF CONTAINERS		9	

ANTICIPATED CHEMICAL HAZARDS: PCBs

RELINQUISHED BY: [1] Jay Cherniak (SIGN)	DATE/TIME MAY 3/88 12:00 AM	RECEIVED BY: (2) (SIGN)
RELINQUISHED BY: [2] (SIGN)	DATE/TIME	RECEIVED BY: (3) (SIGN)
RELINQUISHED BY: [3] (SIGN)	DATE/TIME	RECEIVED BY: (4) (SIGN)
ADDITIONAL SIGNATURE SHEET REQUIRED ☐		

METHOD OF SHIPMENT: FED. EX.	SHIPPED BY: J-L.	RECEIVED FOR LABORATORY BY: (SIGN)	DATE/TIME
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APPENDIX B

ANALYTICAL RESULTS

TABLE B-1

INVESTIGATIVE SOIL SAMPLES - PCB CONCENTRATIONS

PCB AROCHLORS

Sample Number	1016 (mg/kg)	Detection Limit (mg/kg)	1221 (mg/kg)	Detection Limit (mg/kg)	1232 (mg/kg)	Detection Limit (mg/kg)	1242 (mg/kg)	Detection Limit (mg/kg)	1248 (mg/kg)	Detection Limit (mg/kg)	1254 (mg/kg)	Detection Limit (mg/kg)	1260 (mg/kg)	Detection Limit (mg/kg)	Total PCBs (mg/kg)
SUMP SAMPLE LOCATIONS															
1916-SUMP1-A	ND	5	ND	5	ND	5	ND	5	ND	5	8		15		23
1916-SUMP1-B	ND	1	ND	1	ND	1	ND	1	ND	1	2		2		4
1916-SUMP-2A	ND	1	ND	1	ND	1	ND	1	ND	1	4		ND	1	4
1916-SUMP-2B	ND	0.25	ND	0.25	ND	0.25	ND	0.25	ND	0.25	0.5		ND	0.25	0.5
1916-SUMP-3A	ND	1	ND	1	ND	1	ND	1	ND	1	3		ND	1	3
1916-SUMP-3B	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	0.9		ND	0.5	0.9
Deep Subsurface Soils															
CRA-S-011E	ND	5	ND	5	ND	5	11		ND	5	ND	5	ND	5	11
CRA-S-011G	ND	710	ND	710	ND	710	2,000		ND	710	ND	710	ND	710	2,000
CRA-S-011I	ND	20	ND	20	ND	20	ND	20	81		ND	20	ND	20	81
CRA-S-012E	ND	510	ND	510	ND	510	1,500		ND	510	ND	1,000	ND	1,000	1,500
CRA-S-012F	ND	1,100	ND	1,100	ND	1,100	2,700		ND	1,100	ND	2,200	ND	2,200	2,700
CRA-S-012G	ND	1,100	ND	1,100	ND	1,100	4,700		ND	1,100	ND	2,200	ND	2,200	4,700
CRA-S-012I	ND	450	ND	450	ND	450	1,800		ND	450	ND	450	ND	450	1,800
CRA-S-012K	ND	710	ND	710	ND	710	2,400		ND	710	ND	710	ND	710	2,400
CRA-S-015C	ND	940	ND	940	ND	940	1,500		ND	940	ND	1,900	ND	1,900	1,500
CRA-S-015D	ND	1,200	ND	1,200	ND	1,200	2,800		ND	1,200	ND	2,400	ND	2,400	2,800
CRA-S-015E	ND	220	ND	220	ND	220	380		ND	220	ND	450	ND	450	380
CRA-S-015G	ND	0.16	ND	0.16	ND	0.16	0.23		ND	0.16	ND	0.16	ND	0.16	0.23
CRA-S-015I	ND	0.08	ND	0.08	ND	0.08	ND	0.08	ND	0.08	ND	0.16	ND	0.16	ND
CRA-S-017K (BK015K)	ND	0.5 ug/L	ND	0.5 ug/L	ND	0.5 ug/L	ND	0.5 ug/L	ND	0.5 ug/L	ND	1 ug/L	ND	1 ug/L	ND

continued....

TABLE B-1

INVESTIGATIVE SOIL SAMPLES - PCB CONCENTRATIONS

PCB AROCHLORS

Sample Number	1016 (mg/kg)	Detection Limit (mg/kg)	1221 (mg/kg)	Detection Limit (mg/kg)	1232 (mg/kg)	Detection Limit (mg/kg)	1242 (mg/kg)	Detection Limit (mg/kg)	1248 (mg/kg)	Detection Limit (mg/kg)	1254 (mg/kg)	Detection Limit (mg/kg)	1260 (mg/kg)	Detection Limit (mg/kg)	Total PCBs (mg/kg)
Deep Subsurface Soils (continued)															
CRA-S-021E	ND	4,000	ND	4,000	ND	4,000	14,000		ND	4,000	ND	8,000	ND	8,000	14,000
CRA-S-021F	ND	4,100	ND	4,100	ND	4,100	8,300		ND	4,100	ND	8,300	ND	8,300	8,300
CRA-S-021G	ND	3,800	ND	3,800	ND	3,800	11,000		ND	3,800	ND	7,600	ND	7,600	11,000
CRA-S-021I	ND	800	ND	800	ND	800	1,700		ND	800	ND	800	ND	800	1,700
CRA-S-021K	ND	8	ND	8	ND	8	36		ND	8	ND	8	ND	8	36
CRA-S-027E (S-30)	ND	8,000	ND	8,000	ND	8,000	22,000		ND	8,000	22,000		ND	16,000	44,000
CRA-S-027F (S-30)	ND	23,000	ND	23,000	ND	23,000	55,000		ND	23,000	ND	46,000	ND	46,000	55,000
CRA-S-027G (S-30)	ND	20,000	ND	20,000	ND	20,000	42,000		ND	20,000	ND	40,000	ND	40,000	42,000
CRA-S-028E (D027E)(S-30)	ND	20,000	ND	20,000	ND	20,000	26,000		ND	20,000	ND	40,000	ND	40,000	26,000
CRA-S-029E (BK027E)(S-30)	ND	0.5 ug/L	ND	0.5 ug/L	ND	0.5 ug/L	ND	0.5 ug/L	ND	0.5 ug/L	ND	1 ug/L	ND	1 ug/L	ND
CRA-S-070G	ND	2,100	ND	2,100	ND	2,100	5,700		ND	2,100	ND	4,200	ND	4,200	5,700
CRA-S-070H	ND	1,100	ND	1,100	ND	1,100	4,700		ND	1,100	ND	2,200	ND	2,200	4,700
CRA-S-070I	ND	830	ND	830	ND	830	2,500		ND	830	ND	1,700	ND	1,700	2,500
CRA-S-071I (D070I)	ND	400	ND	400	ND	400	1,300		ND	400	ND	800	ND	800	1,300
CRA-S-072I (MS070I)	ND	790	ND	790	ND	790	1,700		ND	790	ND	1,600	ND	1,600	1,700
CRA-S-073I (BK070I)	ND	0.5 ug/L	ND	0.5 ug/L	ND	0.5 ug/L	ND	0.5 ug/L	ND	0.5 ug/L	ND	1 ug/L	ND	1 ug/L	ND
CRA-S-070K	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.2	ND	0.2	ND
CRA-S-070M	ND	5	ND	5	ND	5	ND	5	32		8		ND	5	40
CRA-S-071M (D070M)	ND	19	ND	19	ND	19	ND	19	48		ND		ND	19	48
CRA-S-073M (MS070M)	ND	14	ND	14	ND	14	27		ND	14	ND	14	ND	14	27
CRA-S-072M (BK070M)	ND	0.5 ug/L	ND	0.5 ug/L	ND	0.5 ug/L	ND	0.5 ug/L	ND	0.5 ug/L	ND	1 ug/L	ND	1 ug/L	ND

continued....

TABLE B-1

INVESTIGATIVE SOIL SAMPLES - PCB CONCENTRATIONS

PCB AROCHLORS

Sample Number	1016 (mg/kg)	Detection Limit (mg/kg)	1221 (mg/kg)	Detection Limit (mg/kg)	1232 (mg/kg)	Detection Limit (mg/kg)	1242 (mg/kg)	Detection Limit (mg/kg)	1248 (mg/kg)	Detection Limit (mg/kg)	1254 (mg/kg)	Detection Limit (mg/kg)	1260 (mg/kg)	Detection Limit (mg/kg)	Total PCBs (mg/kg)
Deep Subsurface Soils (continued)															
CRA-S-086E	ND	0.35	ND	0.35	ND	0.35	ND	0.35	ND	0.35	0.41		ND	0.35	0.41
CRA-S-086G	ND	0.16	ND	0.16	ND	0.16	0.2		ND	0.16	ND	0.18	ND	0.18	0.2
CRA-S-088E	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.2	ND	0.2	ND
CRA-S-088F	ND	0.1	ND	0.1	ND	0.1	0.1		ND	0.1	ND	0.2	ND	0.2	0.1
CRA-S-088G	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.2	ND	0.2	ND
CRA-S-129E	ND	3	ND	3	ND	3	ND	3	6		6		ND	3	12
CRA-S-301E (BK129E)	ND	0.5 ug/L	ND	0.5 ug/L	ND	0.5 ug/L	ND	0.5 ug/L	ND	0.5 ug/L	ND	1 ug/L	ND	1 ug/L	ND
CRA-S-142C	ND	5	ND	5	ND	5	ND	5	17		ND	5	ND	5	17
CRA-S-142D	ND	0.6	ND	0.6	ND	0.6	ND	0.6	1		ND	0.6	ND	0.6	1
CRA-S-148E	ND	2,000	ND	2,000	ND	2,000	ND	2,000	3,300		ND	2,000	ND	2,000	3,300
CRA-S-148G	ND	2,300	ND	2,300	ND	2,300	ND	2,300	3,200		ND	2,300	ND	2,300	3,200
CRA-S-148I	ND	2,400	ND	2,400	ND	2,400	ND	2,400	4,800		ND	2,400	ND	2,400	4,800
CRA-S-148M	ND	750	ND	750	ND	750	2,800		ND	750	ND	750	ND	750	2,800
CRA-S-149I (D148I)	ND	670	ND	670	ND	670	ND	670	1,500		ND	670	ND	670	1,500
CRA-S-151I (D148I)	ND	470	ND	470	ND	470	ND	470	1,600		ND	470	ND	470	1,600
CRA-S-151I (MS148I)	ND	1,500	ND	1,500	ND	1,500	ND	1,500	3,300		ND	1,500	ND	1,500	3,300
CRA-S-151I (MSD148I)	ND	1,500	ND	1,500	ND	1,500	ND	1,500	1,800		ND	1,500	ND	1,500	1,800
CRA-S-150I (BK148I)	ND	0.5ug/L	ND	0.5ug/L	ND	0.5ug/L	ND	0.5ug/L	ND	0.5 ug/L	ND	1 ug/L	ND	1 ug/L	ND
CRA-S-200B	ND	1	ND	1	ND	1	ND	1	1		ND	1	ND	1	1
CRA-S-200D	ND	0.2	ND	0.2	ND	0.2	0.41		ND	0.2	ND	0.2	ND	0.2	0.41

continued....

TABLE B-1

INVESTIGATIVE SOIL SAMPLES - PCB CONCENTRATIONS

PCB AROCHLORS

Sample Number	1016 (mg/kg)	Detection Limit (mg/kg)	1221 (mg/kg)	Detection Limit (mg/kg)	1232 (mg/kg)	Detection Limit (mg/kg)	1242 (mg/kg)	Detection Limit (mg/kg)	1248 (mg/kg)	Detection Limit (mg/kg)	1254 (mg/kg)	Detection Limit (mg/kg)	1260 (mg/kg)	Detection Limit (mg/kg)	Total PCBs (mg/kg)
Ravine Pipe Discharge Zones															
CRA-S-2001	ND	13	ND	13	ND	13	ND	13	67		ND	26	ND	26	67
CRA-S-2002	ND	0.2	ND	0.2	ND	0.2	ND	0.2	1.3		ND	0.4	ND	0.4	1.3
CRA-S-2003	ND	420	ND	420	ND	420	ND	420	1,400		ND	840	ND	840	1,400
CRA-S-2004	ND	9	ND	9	ND	9	ND	9	25		ND	17	ND	17	25
CRA-S-2033 (BK2002)	ND	0.5ug/L	ND	0.5ug/L	ND	0.5ug/L	ND	0.5ug/L	ND	0.5ug/L	ND	1 ug/L	ND	1 ug/L	ND
CRA-S-2034 (D2002)	ND	0.2	ND	0.2	ND	0.2	ND	0.2	0.8		ND	0.4	ND	0.4	0.8
Test Trench Pipe Bedding Samples															
CRA-S-TT1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.1	ND	0.2	ND	0.2	ND
CRA-S-TT5	ND	190	ND	190	ND	190	ND	190	1,100		ND	380	ND	380	1,100
CRA-S-TT6	ND	19	ND	19	ND	19	ND	19	130		ND	39	ND	39	130
CRA-S-TT7	ND	5	ND	5	ND	5	ND	5	10		ND	5	ND	5	10
CRA-S-TT8	ND	0.08	ND	0.08	ND	0.08	ND	0.08	0.09		ND	0.16	ND	0.16	0.09
CRA-S-TT13A	ND	130	ND	130	ND	130	ND	130	ND	130	330		ND	130	330
CRA-S-TT13B	ND	1	ND	1	ND	1	ND	1	ND	1	2		ND	1	2
Ravine Sediment and Floodplain															
CRA-SD-015B	ND	2	ND	2	ND	2	ND	2	7.7		10		ND	3	17.7
CRA-SD-015C	ND	3	ND	3	ND	3	ND	3	20		11		ND	6	31
CRA-S-015E	ND	2	ND	2	ND	2	ND	2	5		ND	4	ND	4	5
CRA-S-015W	ND	0.2	ND	0.2	ND	0.2	ND	0.2	1.4		ND	0.4	ND	0.4	1.4
CRA-S-2035 (BK015W)	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	1	ND	1	ND

continued....

TABLE B-1

INVESTIGATIVE SOIL SAMPLES - PCB CONCENTRATIONS

PCB AROCHLORS

Sample Number	1016 (mg/kg)	Detection Limit (mg/kg)	1221 (mg/kg)	Detection Limit (mg/kg)	1232 (mg/kg)	Detection Limit (mg/kg)	1242 (mg/kg)	Detection Limit (mg/kg)	1248 (mg/kg)	Detection Limit (mg/kg)	1254 (mg/kg)	Detection Limit (mg/kg)	1260 (mg/kg)	Detection Limit (mg/kg)	Total PCBs (mg/kg)
Ravine Sediment and Floodplain (continued)															
CRA-S-2036 (D015W)	ND	1	ND	1	ND	1	ND	1	3.4		ND	2	ND	2	3.4
CRA-S-2037 (MS015W)	ND	0.3	ND	0.3	ND	0.3	ND	0.3	1.8		ND	0.5	ND	0.5	1.8
CRA-S-019E	ND	0.7	ND	0.7	ND	0.7	ND	0.7	2.7		ND	1.4	ND	1.4	2.7
CRA-S-019W	ND	3	ND	3	ND	3	ND	3	6.5		16		ND	5	22.5
CRA-S-144E	ND	130	ND	130	ND	130	ND	130	ND	130	240		ND	130	240
CRA-S-144W	ND	1	ND	1	ND	1	ND	1	1		ND	1	ND	1	1
CRA-S-500W (D144W)	ND	0.3	ND	0.3	ND	0.3	ND	0.3	0.74		ND	0.3	ND	0.3	0.74
CRA-S-501/W (MS144W)	ND	1	ND	1	ND	1	ND	1	1		ND	1	ND	1	1
CRA-S-505E	ND	5	ND	5	ND	5	ND	5	12		ND	5	ND	5	12
CRA-S-510E	ND	630	ND	630	ND	630	ND	630	1,800		ND	630	ND	630	1,800
CRA-S-515E	ND	300	ND	300	ND	300	ND	300	ND	300	410		ND	300	410

Notes:

ND - None detected
(D027E) - Indicates a field duplicate of sample S-027E
(BK027E) - Indicates a field blank of sample S-027E
(MS0701) - Indicates a matrix spike of sample S-0701
(S-30) - Indicates actual sample location at S-30
All samples analyzed in accordance with Method SW-846 protocols
Samples SUMP1-A, SUMP1-B, SUMP-2A, SUMP-2B, SUMP-3A, SUMP-3B also analyzed for PCB 1262 Arochlor; all results ND. Detection limits for PCB 1262 were 5, 1, 1, 0.25, 1, 0.5 mg/kg, respectively

TABLE B-2

INVESTIGATIVE SOIL SAMPLES - CHLORINATED DIBENZO-P-DIOXINS (CDDs)

CDD Homologue Concentrations (ng/g)

Sample Number	Tetra	Detection Limit	Penta	Detection Limit	Hexa	Detection Limit	Hepta	Detection Limit	Octa	Detection Limit	Total
CRA-S-013B	ND[1]	0.011	ND	0.069	ND	0.047	ND	0.035	ND	0.10	ND
CRA-S-015B	ND	0.0081	ND	0.051	ND	0.028	0.16		0.74		0.90
CRA-S-021B	ND	0.018	ND	0.055	ND	0.046	ND	0.051	0.35		0.35
CRA-S-032A	ND	0.0059	ND	0.026	ND	0.023	ND	0.023	ND	0.15	ND
CRA-S-038A	ND	0.0070	ND	0.052	ND	0.044	ND	0.054	ND	0.12	ND
CRA-S-038B	ND	0.010	ND	0.034	ND	0.025	ND	0.017	ND	0.058	ND
CRA-S-079A	ND	0.0048	ND	0.030	ND	0.020	ND	0.026	0.22		0.22
CRA-S-088A	ND	0.018	ND	0.047	ND	0.032	0.33		0.95		1.28
CRA-S-152A	ND	0.016	ND	0.034	ND	0.038	ND	0.053	0.21		0.21
CRA-S-400A(D152A)[2]	ND	0.0093	ND	0.036	ND	0.027	ND	0.032	0.23		0.23
CRA-S-401A(BK152A)[3]	ND	0.088ng/L	ND	0.043ng/L	ND	0.126 ng/L	ND	0.124 ng/L	ND	1.3 ng/L	ND

Notes:

(1) ND - not detected
(2) (D152A) - field duplicate of S-152A
(3) (BK152A) - rinsate blank at S-152A
(4) Analytical results for homologue classes based on Method 8280, Method of Analysis for Chlorinated Dibenzo-p-dioxins and Dibenzofurans, 40 CFR Part 261 Appendix X.

TABLE B-3

INVESTIGATIVE SOIL SAMPLES - CHLORINATED DIBENZOFURANS (CDFs)

CDF Homologue Concentrations (ng/g)

Sample Number	Tetra	Detection Limit	Penta	Detection Limit	Hexa	Detection Limit	Hepta	Detection Limit	Octa	Detection Limit	Total
CRA-S-013B	0.096		0.20		0.54		ND(1)	0.11	ND	0.18	0.836
CRA-S-015B	2.7		7.2		9.6		2.6		2.5		24.6
CRA-S-021B	11		2.0		ND	0.041	ND	0.034	ND	0.079	13.0
CRA-S-032A	0.51		0.38		0.62		0.15		0.18		1.84
CRA-S-038A	0.53		ND	0.087	ND	0.053	ND	0.050	ND	0.092	0.53
CRA-S-038B	ND	0.021	ND	0.037	ND	0.010	ND	0.014	ND	0.044	ND
CRA-S-079A	0.051		ND	0.037	ND	0.012	ND	0.016	ND	0.038	0.051
CRA-S-088A	4.1		2.5		2.1		0.49		0.33		9.52
CRA-S-152A	2.3		0.52		0.44		ND	0.11	ND	0.14	3.26
CRA-S-400A(D152A)(2)	2.3		0.90		0.51		0.14		0.17		4.02
CRA-S-401A(BK152A)(3)	ND	0.059ng/L	ND	0.42ng/L	ND	0.14 ng/L	ND	0.18 ng/L	ND	0.86 ng/L	ND

Notes:

(1) ND - not detected
(2) (D152A) - field duplicate of S-152A
(3) (BK152A) - rinsate blank at S-152A
(4) Analytical results for homologue classes based on Method 8280, Method of Analysis for Chlorinated Dibenzo-p-dioxins and Dibenzofurans, 40 CFR Part 261 Appendix X.

TABLE B-4

CONFIRMATORY SOIL SAMPLES - PCB CONCENTRATIONS

PCB AROCHLORS

Sample Number	1016 (mg/kg)	Detection Limit (mg/kg)	1221 (mg/kg)	Detection Limit (mg/kg)	1232 (mg/kg)	Detection Limit (mg/kg)	1242 (mg/kg)	Detection Limit (mg/kg)	1248 (mg/kg)	Detection Limit (mg/kg)	1254 (mg/kg)	Detection Limit (mg/kg)	1260 (mg/kg)	Detection Limit (mg/kg)	Total PCBs (mg/kg)
Excavation Area A															
CRA-SD-2005A	ND	210	ND	210	ND	210	1,300		ND	210	ND	410	ND	410	1,300
CRA-SD-2005B	ND	1,100	ND	1,100	ND	1,100	4,200		ND	1,100	ND	2,300	ND	2,300	4,200
CRA-SD-2006A	ND	4,500	ND	4,500	ND	4,500	16,000		ND	4,300	ND	9,000	ND	9,000	16,000
CRA-SD-2007A	ND	4,000	ND	4,000	ND	4,000	5,800		ND	4,000	ND	8,000	ND	8,000	5,800
CRA-SD-2008A	ND	250	ND	250	780		ND	250	ND	250	ND	500	ND	500	780
CRA-SD-2008B	2,200		2,200		2,200		5,200		2,200		4,500		4,500		23,000
CRA-SD-2009A (BK2005A)	ND	0.5 ug/L	ND	0.5 ug/L	ND	0.5 ug/L	ND	0.5 ug/L	ND	0.5 ug/L	ND	1.0 ug/L	ND	1.0 ug/L	ND
CRA-SD-2010A (D2005A)	ND	1,000	ND	1,000	ND	1,000	1,500		ND	1,000	ND	2,000	ND	2,000	1,500
CRA-SD-2011A	ND	4,700	ND	4,700	ND	4,700	16,000		ND	4,700	ND	9,500	ND	9,500	16,000
CRA-SD-2011B	ND	4,200	ND	4,200	ND	4,200	9,700		ND	4,200	ND	8,300	ND	8,300	9,700
Excavation Area B															
CRA-S-2012A	ND	950	ND	950	ND	950	2,600		ND	950	ND	1,900	ND	1,900	2,600
CRA-S-2013A	ND	0.9	ND	0.9	ND	0.9	1.3		ND	0.9	ND	1.8	ND	1.8	1.3
CRA-S-2014A	ND	9	ND	9	ND	9	17		ND	9	ND	18	ND	18	17
CRA-S-2015A	ND	0.19	ND	0.19	ND	0.19	0.5		ND	0.19	ND	0.37	ND	0.37	0.5
CRA-S-2016A (BK2015A)	ND	1.0 ug/L	ND	1.0 ug/L	ND	1.0 ug/L	ND	1.0 ug/L	3.4 ug/L		ND	2.0 ug/L	ND	2.0 ug/L	3.4 ug/L
CRA-S-2017A (D2015A)	ND	0.19	ND	0.19	ND	0.19	0.83		ND	0.19	ND	0.37	ND	0.37	0.83
CRA-S-2018A (MS2015A)	ND	0.18	ND	0.18	ND	0.18	0.86		ND	0.18	ND	0.37	ND	0.37	0.86
Depth Zone 2 Stockpile															
CRA-SPN-2019	ND	180	ND	180	ND	180	420		ND	180	ND	360	ND	360	420
CRA-SPE-2022	ND	190	ND	190	ND	190	320		ND	190	ND	380	ND	380	320
CRA-SPN-2023 (DSPN-2019)	ND	190	ND	190	ND	190	440		ND	370	ND	370	ND	370	440

Notes:

ND - None detected
(BK2015A) - Indicates a field blank of sample S-2015A
(D2015A) - Indicates a field duplicate of sample S-2015A
(MS2015A) - Indicates a matrix spike of sample S-2015A
All samples analyzed in accordance with CLP protocols.

TABLE B-5

CONFIRMATORY WIPE SAMPLES - PCB CONCENTRATIONS

	PCB AROCHLORS																
	1016	Detection Limit	1221	Detection Limit	1232	Detection Limit	1242	Detection Limit	1248	Detection Limit	1254	Detection Limit	1260	Detection Limit	TOTAL PCBs
Sample Number	($ug/100\ cm^2$)	(ug/swab)	($ug/100\ cm^2$)	(ug/swab)	($ug/100\ cm^2$)	(ug/swab)	($ug/100\ cm^2$)	(ug/swab)	($ug/100\ cm^2$)	(ug/swab)	($ug/100\ cm^2$)	(ug/swab)	($ug/100\ cm^2$)	(ug/swab)	($ug/100\ cm^2$)
CRA-WP-3000 (casing)	ND	3	ND	3	ND	3	ND	3	45.4	16	ND	6	ND	6	45.4
CRA-WP-3001 (casing)	ND	10	ND	10	ND	10	ND	10	4.2	19	ND	20	ND	20	4.2
CRA-WP-3002 (casing	ND	50	ND	50	ND	50	ND	50	39.0	86	ND	100	ND	100	39.0
CRA-WP-3003 (casing)	ND	50	ND	50	ND	50	ND	50	20.8	120	ND	100	ND	100	20.8
CRA-WP-3004 (casing)	ND	10	ND	10	ND	10	ND	10	4.0	24	ND	20	ND	20	4.0
CRA-WP-3005 (pump)	ND	10	ND	10	ND	10	ND	10	5.9	14	22.5	53	ND	20	28.4
CRA-WP-3006 (pump foundation)	ND	25	ND	25	ND	25	ND	25	66.5	54	ND	50	ND	50	66.5
CRA-WP-3007 (R3000)	ND	10	ND	10	ND	10	ND	10	44.9	19	ND	20	ND	20	44.9
CRA-WP-3008 (MS3000)	ND	10	ND	10	ND	10	ND	10	49.3	17	ND	20	ND	20	49.3
CRA-WP-3009 (BK3000)	ND	10	ND	10	ND	10	ND	10	22		ND	20	ND	20	22
CRA-WP-3010 (casing)	ND	50	ND	50	ND	50	ND	50	62.7	93	ND	100	ND	100	62.7
CRA-WP-3011 (casing)	ND	10	ND	10	ND	10	ND	10	ND	1	ND	2	ND	2	ND

Notes:

ND - None Detected.
(R3000) - Indicates a field replicate of sample WP-3000.
(MS3000) - Indicates a matrix spike of sample WP-3000.
(BK3000) - Indicates a field blank of sample WP-3000.
All samples analyzed in accordance with CLP protocols.

TABLE B-6

WASTEWATER DISPOSAL CHARACTERIZATION - PCB CONCENTRATIONS

PCB AROCHLORS

Sample Number	1016	Detection Limit	1221	Detection Limit	1232	Detection Limit	1242	Detection Limit	1248	Detection Limit	1254	Detection Limit	1260	Detection Limit	Total
CRA-WT-2026	ND[1]	1,300	ND	1,300	ND	1,300	5,300		ND	1,300	ND	2,600	ND	2,600	5,300
CRA-WT-2027 (MSWT-2026)[2]	ND	1,300	ND	1,300	ND	1,300	5,200		ND	1,300	ND	2,600	ND	2,600	5,200
CRA-WT-2030 (DWT-2026)[3]	ND	1,300	ND	1,300	ND	1,300	5,300		ND	1,300	ND	2,600	ND	2,600	5,300
CRA-WT-2031 (BKWT-2026)[4]	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	0.5	ND	1	ND	1	ND

Notes:

(1) ND - not detected
(2) (MSWT-2026) - matrix spike of WT-2026
(3) (DWT-2026) - field duplicate of WT-2026
(4) (BKWT-2026) - blank of WT-2026

TABLE B-7

WASTEWATER DISPOSAL CHARACTERIZATION
VOLATILE ORGANIC COMPOUNDS (VOCs) (1)

PARAMETER HSL VOCs	RESULT (ug/L)	DETECTION LIMIT
Chlormethane	ND (2)	100
Bromomethane	ND	100
Vinyl chloride	ND	100
Chloroethane	ND	100
Methylene chloride	ND	50
Acetone	ND	100
Carbon disulfide	ND	50
1,1-Dichloroethene	ND	50
1,1-Dichloroethane	ND	50
1,2-Dichloroethene (Total)	20 J (3)	50
Chloroform	ND	50
1,2-Dichloroethane	ND	50
2-Butanone	ND	100
1,1,1-Trichloroethane	ND	50
Carbon tetrachloride	ND	50
Vinyl acetate	ND	100
Bromodichloromethane	ND	50
1,2-Dichloropropane	ND	50
Trans-1,3-Dichloropropene	ND	50
Trichloroethene	ND	50
Dibormochloromethane	ND	50
1,1,2-Trichloroethane	ND	50
Benzene	44 J	50
cis-1,2-Dichloropropene	ND	50
Bromoform	ND	100
4-Methyl-2-pentanone	ND	100
2-Hexanone	ND	50
Tetrachloroethene	ND	50
1,1,2,2-Tetrachloroethane	ND	50
Toluene	36 J	50
Chlorobenzene	ND	50
Ethylbenzene	ND	50
Styrene	ND	50
Total Xylenes	ND	50

Identified Non-Regulated Compounds

Unknown	2,000
Unknown	3,000
Unknown	50

Notes

(1) Analyses for sample CRA-WT-2029
(2) ND - not detected
(3) J - estimated concentration below minimum detection limit

TABLE B-8

WASTEWATER DISPOSAL CHARACTERIZATION
BASE NEUTRAL ACID EXTRACTABLE (BNA) COMPOUNDS[1]

PARAMETER	RESULT (ug/L)	DETECTION LIMIT
HSL BNAs		
Acenaphthene	ND[2]	10
Acenaphthylene	ND	10
Anthracene	ND	10
Benzidine	ND	50
Benzo(a)anthracene	ND	10
Benzo(b)fluoranthene	ND	10
Benzo(k)fluoranthene	ND	10
Benzo(ghi)perylene	ND	10
Benzo(a)pyrene	ND	10
Bis(2-chloroethoxy)methane	ND	10
Bis(2-chloroethyl)ether	ND	10
Bis(2-chloroisopropyl)ether	ND	10
Bis(2-ethylhexyl)phthalate	6 J[3]	10
4-Bromophenyl phenyl ether	ND	10
Butyl benzyl phthalate	ND	10
2-Chloronaphthalene	ND	10
4-Chlorophenol phenyl ether	ND	10
Chrysene	ND	10
Dibenzo(a,h)anthracene	ND	10
Di-n-butyl phthalate	ND	10
1,2-Dichlorobenzene	ND	10
1,3-Dichlorobenzene	ND	10
1,4-Dichlorobenzene	ND	10
3,3'-Dichlorobenzidine	ND	50
Diethyl phthalate	ND	10
Dimethyl phthalate	ND	10
2,4-Dinitrotoluene	ND	10
2,6-Dinitrotoluene	ND	10
Di-n-octyl phthalate	ND	10
Fluoranthene	ND	10
Fluorene	ND	10
Hexachlorobenzene	ND	10
Hexachlorobutadiene	ND	10
Hexachlorocyclopentadiene	ND	10
Hexachloroethane	ND	10
Indeno(1,2,3-CD)pyrene	ND	10
Isophorone	13	10
Naphthalene	8 J	10
Nitrobenzene	ND	10
N-Nitrosodimethylamine	ND	10
N-Nitrosodiphenylamine	ND	10
N-Nitrosodi-n-propylamine	ND	10
Phenanthrene	ND	10
Pyrene	ND	10
1,2,4,Trichlorobenzene	ND	10

continued....

TABLE B-8

WASTEWATER DISPOSAL CHARACTERIZATION
BASE NEUTRAL ACID EXTRACTABLE (BNA) COMPOUNDS(1)

PARAMETER	RESULT (ug/L)	DETECTION LIMIT
Non-listed Quantified Compounds		
Benzyl alcohol	90	
Benzoic acid	11	
2-Methylnaphthalene	7 J	
Identified Non-regulated Compounds		
1-Hexanol 2-ethyl-	600	
Ethanol,2-[2-(2methoxy ethoxy)ethoxy]-	200	
Ethanol,2-[2-(2-ethoxy ethoxy)ethoxy]-	200	
Ethanol,2-[2-(2-butoxy ethoxy)ethoxy]-	300	
Benzene,1-isocyanato-2-methyl-	200	
1,1-Biphenyl,2,4,6-trichloro-	300	
1,1-Biphenyl,2,4,6-trichloro-	400	
1,1-Biphenyl,tetrachloro-	200	
Decanedioic acid,bis(2-ethylhexyl)ester	1,000	

Notes:

(1) Analyses for Sample CRA-WT-2032
(2) ND - not detected
(3) J - estimated concentration below minimum detection limit

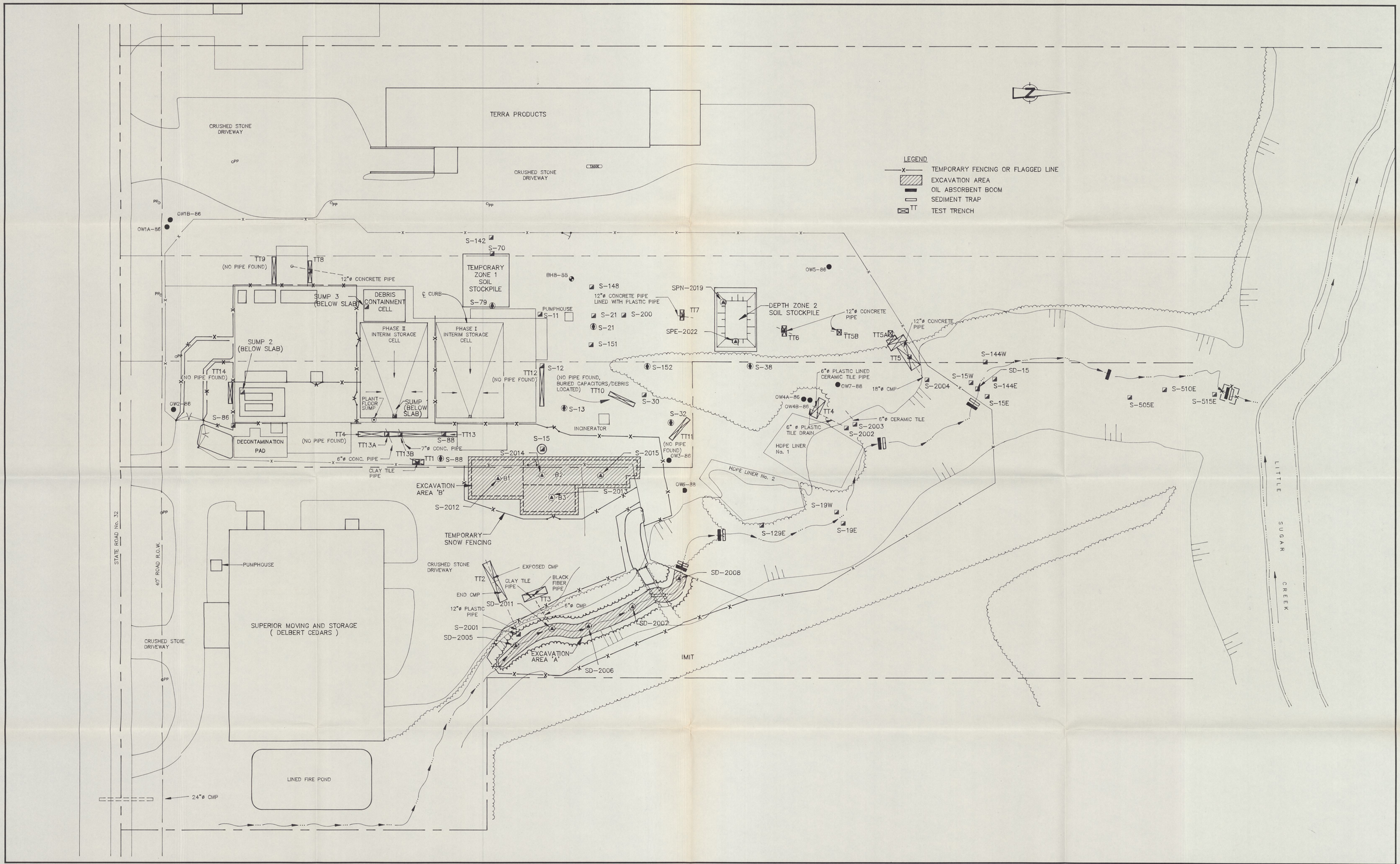
TABLE B-9

WASTEWATER DISPOSAL CHARACTERIZATION - CDDS/CDF[1]

PARAMETER	RESULTS (ng/L)	DETECTION LIMIT
Furans		
Tetra (total)	15	-
Penta	14	-
Hexa	14	-
Hepta	4.1	-
Octa	2.2	-
Total	49.3	
Dioxins		
Tetra (total)	ND[2]	0.062
Penta	ND	0.17
Hexa	ND	0.11
Hepta	1.2	-
Octa	3.0	-
Total	4.2	

Notes

(1) Analyses for sample CRA-WT-2028
(2) ND - not detected



LEGEND

- TREE LINE
- TOP OF SLOPE
- STREAM FLOW
- CREEK BANK
- OW5-86 OBSERVATION WELL
- BH8-88 BOREHOLE
- PROPERTY LINE
- SECURITY FENCE
- ACCESS GATE
- oPP POWER POLE
- S-21 INVESTIGATIVE SOIL/SEDIMENT SAMPLE LOCATION FOR PCBs
- S-2012 CONFIRMATORY SOIL/SEDIMENT SAMPLE LOCATION FOR PCBs
- INVESTIGATIVE SOIL SAMPLE LOCATION FOR CDD/CDF
- INVESTIGATIVE SOIL SAMPLE LOCATION FOR PCBs AND CDD/CDF

№	Revision	Date	Initial

Approved

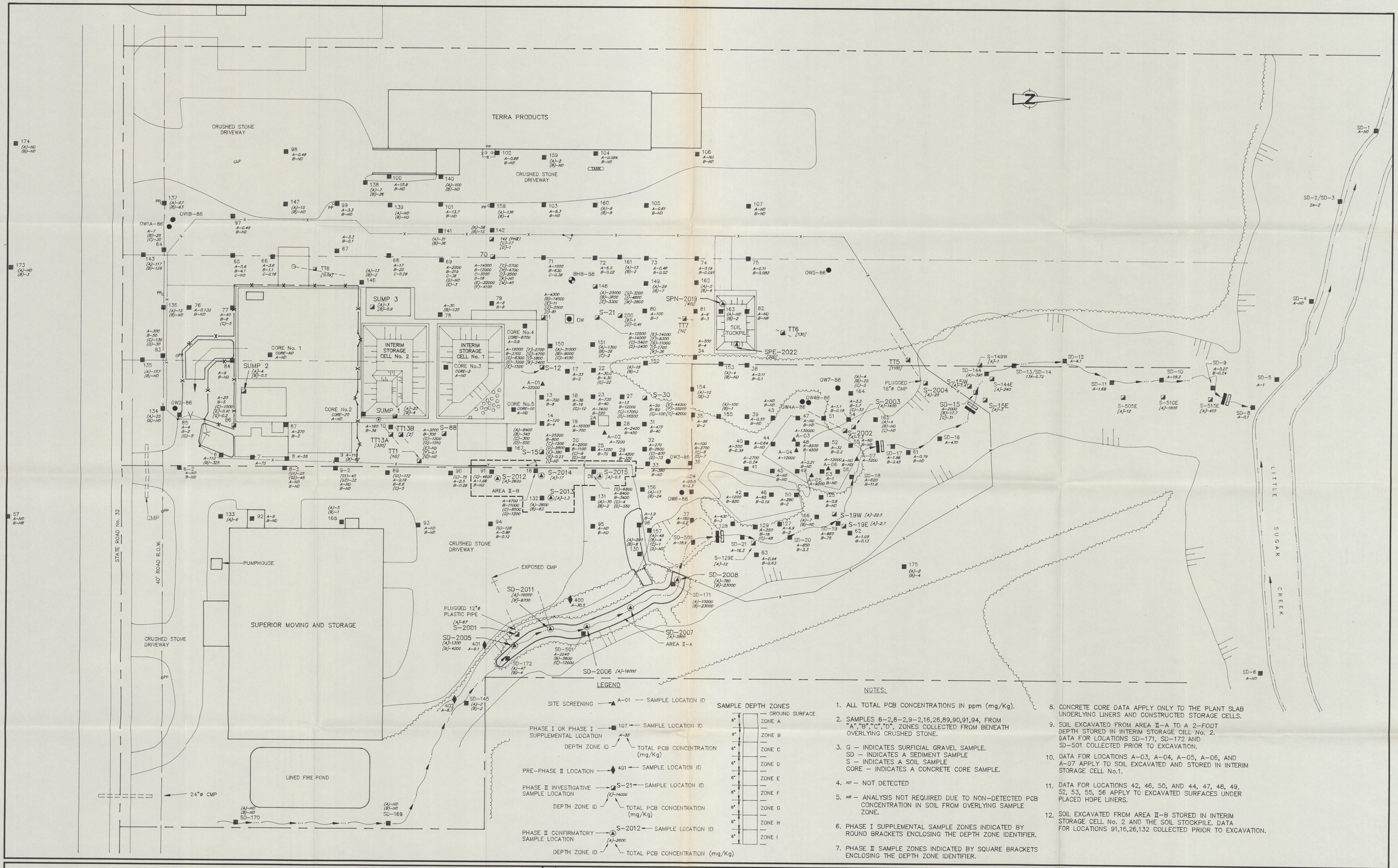
FORMER P.R. MALLORY PLANT SITE
CRAWFORDSVILLE, INDIANA.

PHASE II SAMPLING AND ANALYSIS REPORT

PHASE II SAMPLE LOCATIONS

CRA
CONESTOGA-ROVERS & ASSOCIATES

Drawn by: B.L.P.	Scale: 1" = 40'	Date: AUGUST 1988	File №: S	Rev.№: 0
Designed by: J.C.				
Checked by: R.T.P.	Field book:	Project №: 1916	Drawing №: 57 (P-24) PLAN 1	



LEGEND

SITE SCREENING — A-01 — SAMPLE LOCATION ID

PHASE I OR PHASE I SUPPLEMENTAL LOCATION — 107 — SAMPLE LOCATION ID; DEPTH ZONE ID — A-55 — TOTAL PCB CONCENTRATION (mg/Kg)

PRE-PHASE II LOCATION — 401 — SAMPLE LOCATION ID

PHASE II INVESTIGATIVE SAMPLE LOCATION — S-21 — SAMPLE LOCATION ID; DEPTH ZONE ID — (C)-14000 — TOTAL PCB CONCENTRATION (mg/Kg)

PHASE II CONFIRMATORY SAMPLE LOCATION — S-2012 — SAMPLE LOCATION ID; DEPTH ZONE ID — (A)-2600 — TOTAL PCB CONCENTRATION (mg/Kg)

SAMPLE DEPTH ZONES

GROUND SURFACE	
6"	ZONE A
6"	ZONE B
6"	ZONE C
6"	ZONE D
6"	ZONE E
6"	ZONE F
6"	ZONE G
6"	ZONE H
6"	ZONE I

NOTES:

1. ALL TOTAL PCB CONCENTRATIONS IN ppm (mg/Kg).
2. SAMPLES 6-2,8-2,9-2,16,26,89,90,91,94, FROM "A","B","C","D", ZONES COLLECTED FROM BENEATH OVERLYING CRUSHED STONE.
3. G - INDICATES SURFICIAL GRAVEL SAMPLE.
   SD - INDICATES A SEDIMENT SAMPLE
   S - INDICATES A SOIL SAMPLE
   CORE - INDICATES A CONCRETE CORE SAMPLE.
4. ND - NOT DETECTED
5. NR - ANALYSIS NOT REQUIRED DUE TO NON-DETECTED PCB CONCENTRATION IN SOIL FROM OVERLYING SAMPLE ZONE.
6. PHASE I SUPPLEMENTAL SAMPLE ZONES INDICATED BY ROUND BRACKETS ENCLOSING THE DEPTH ZONE IDENTIFIER.
7. PHASE II SAMPLE ZONES INDICATED BY SQUARE BRACKETS ENCLOSING THE DEPTH ZONE IDENTIFIER.
8. CONCRETE CORE DATA APPLY ONLY TO THE PLANT SLAB UNDERLYING LINERS AND CONSTRUCTED STORAGE CELLS.
9. SOIL EXCAVATED FROM AREA II-A TO A 2-FOOT DEPTH STORED IN INTERIM STORAGE CELL No. 2. DATA FOR LOCATIONS SD-171, SD-172 AND SD-501 COLLECTED PRIOR TO EXCAVATION.
10. DATA FOR LOCATIONS A-03, A-04, A-05, A-06, AND A-07 APPLY TO SOIL EXCAVATED AND STORED IN INTERIM STORAGE CELL No.1.
11. DATA FOR LOCATIONS 42, 46, 50, AND 44, 47, 48, 49, 52, 53, 55, 56 APPLY TO EXCAVATED SURFACES UNDER PLACED HDPE LINERS.
12. SOIL EXCAVATED FROM AREA II-B STORED IN INTERIM STORAGE CELL No. 2 AND THE SOIL STOCKPILE. DATA FOR LOCATIONS 91,16,26,132 COLLECTED PRIOR TO EXCAVATION.

LEGEND

- TREE LINE
- TOP OF SLOPE
- STREAM FLOW
- CREEK BANK
- OW5-86 — OBSERVATION WELL
- BH8-88 — BOREHOLE
- oPP — POWER POLE
- PROPERTY LINE
- ACCESS GATE
- oLP — LAMP POST
- SECURITY FENCE

No	Revision	Date	Initial

Approved

FORMER P.R. MALLORY PLANT SITE
CRAWFORDSVILLE, INDIANA.

PHASE II SAMPLING AND ANALYSIS REPORT

TOTAL PCB CONCENTRATIONS

SOIL, SEDIMENT AND CONCRETE SAMPLES

CRA
CONESTOGA-ROVERS & ASSOCIATES

Drawn by: B.L.P.	Scale: 1" = 40'	Date: AUGUST 1988	File No: S	Rev.No: 0
Designed by: J.C.	Field book:	Project No: 1916	Drawing No: 58 (P-25) PLAN 2	
Checked by: R.T.P.				

TERRA PRODUCTS

CRUSHED STONE DRIVEWAY

CRUSHED STONE DRIVEWAY

CRUSHED STONE DRIVEWAY

174
(A)-ND(NR)

173
(A)-ND(ND)

57
A-0.98(ND)

97
A-ND(0.65)

69
A-ND(12.15)

107
A-ND(ND)

79
[A]-0.22(0.051)

CORE No.4
A-0.84(1.74)

21
A-1.68(53.13)
[B]-0.357(3.0)

INTERIM STORAGE CELL No. 2

SOIL PILE #1

SOIL PILE #2

INTERIM STORAGE CELL No. 1

SOIL STOCKPILE

152
[A]-0.21(3.26)

38
A-0.71(0.48)
[A]-ND(0.25)
[B]-ND(ND)

A-01
A-6.97(34.7)

13
[B]-ND(0.835)

32
[A]-ND(NA)

A-02
A-2.76(384.8)

88
[A]-1.28(9.32)

15
A-1.43(184.58)
[B]-0.92(24.8)

90
A-4.55(ND)

AREA II-B

A-03
A-0.63(487.0)

48
A-ND(306.1)

A-04
A-2.1(509.)

A-07
A-0.75(106.6)

A-06
A-2.7(1922)

49
A-ND(2.05)

A-05
A-12.8(2087)

62
A-ND(0.51)

175
(A)-ND(ND)

PLUGGED 18"ø CMP

SD-13/SD-14
13A-ND(ND)

SD-2/SD-3
2A-ND(ND)

LITTLE SUGAR CREEK

SD-6
A-ND(3.18)

CMP

STATE ROAD No. 32

40' ROAD R.O.W.

PUMPHOUSE

SUPERIOR MOVING AND STORAGE

CRUSHED STONE DRIVEWAY

LINED FIRE POND

24"ø CMP

EXPOSED CMP

PLUGGED 12"ø PLASTIC PIPE

AREA II-A

LEGEND

SITE SCREENING LOCATION — A-01 — SAMPLE LOCATION ID

PHASE I OR PHASE I SUPPLEMENTAL LOCATION — 38 — SAMPLE LOCATION ID

DEPTH ZONE ID — A-0.71(0.48) — TOTAL FURAN CONCENTRATION (ug/Kg)

TOTAL DIOXIN CONCENTRATION (ug/Kg)

PHASE II LOCATION — 32 — SAMPLE LOCATION ID

DEPTH ZONE ID — A]-ND(1.84) — TOTAL FURAN CONCENTRATION (ug/Kg)

TOTAL DIOXIN CONCENTRATION (ug/Kg)

SAMPLE DEPTH ZONES

—	GROUND SURFACE
6"	ZONE A
6"	ZONE B
6"	ZONE C
6"	ZONE D
6"	ZONE E
6"	ZONE F
6"	ZONE G
6"	ZONE H
6"	ZONE I

1. ALL TOTAL DIOXIN/FURAN CONCENTRATIONS IN ppb (ug/Kg). TOTALS INCLUDE TETRA, PENTA, HEXA, HEPTA AND OCTA HOMOLOGUES
2. SAMPLE 90 FROM ZONE"A" COLLECTED FROM BENEATH OVERLYING CRUSHED STONE.
3. G – INDICATES SURFICIAL GRAVEL SAMPLE.
   SD – INDICATES A SEDIMENT SAMPLE
   S – INDICATES A SOIL SAMPLE
   CORE – INDICATES A CONCRETE CORE SAMPLE.
4. ND – NOT DETECTED
5. NR – ANALYSIS NOT REQUIRED DUE TO NON-DETECTED PCB CONCENTRATION IN SOIL FROM OVERLYING SAMPLE ZONE.
6. PHASE I SUPPLEMENTAL SAMPLE ZONES INDICATED BY BRACKETS ENCLOSING THE DEPTH ZONE IDENTIFIER.
7. CONCRETE CORE DATA APPLY ONLY TO THE PLANT SLAB UNDERLYING LINERS AND CONSTRUCTED STORAGE CELLS.
8. DATA FOR LOCATIONS A-03, A-04, A-05, A-06, AND A-07 APPLY TO SOIL EXCAVATED AND STORED IN INTERIM STORAGE CELL No. 1.
9. DATA FOR LOCATIONS 48 AND 49 APPLY TO EXCAVATED SURFACE UNDER PLACED HDPE LINER.

LEGEND

TREE LINE
TOP OF SLOPE
STREAM FLOW
CREEK BANK
OBSERVATION WELL
POWER POLE
PROPERTY LINE
SECURITY FENCE
ACCESS GATE
LAMP POST

Nº	Revision	Date	Initial

Approved

FORMER P.R. MALLORY PLANT SITE
CRAWFORDSVILLE, INDIANA.

PHASE II SAMPLING AND ANALYSIS REPORT

TOTAL DIOXIN AND FURAN CONCENTRATIONS
SOIL AND SEDIMENT SAMPLES

CRA
CONESTOGA-ROVERS & ASSOCIATES

Drawn by: B.T.S.	Scale: 1" = 40'	Date: AUGUST 1988	File Nº: S	Rev.Nº: 0
Designed by: C.P.H.E.	Field book:	Project Nº: 1916	Drawing Nº: 56 (P-23) PLAN 3	
Checked by: R.T.P.				